## **General Disclaimer**

# One or more of the Following Statements may affect this Document

- This document has been reproduced from the best copy furnished by the organizational source. It is being released in the interest of making available as much information as possible.
- This document may contain data, which exceeds the sheet parameters. It was furnished in this condition by the organizational source and is the best copy available.
- This document may contain tone-on-tone or color graphs, charts and/or pictures, which have been reproduced in black and white.
- This document is paginated as submitted by the original source.
- Portions of this document are not fully legible due to the historical nature of some
  of the material. However, it is the best reproduction available from the original
  submission.

Produced by the NASA Center for Aerospace Information (CASI)

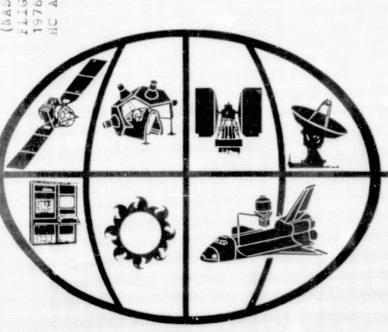
76SDS4263 **15 OCTOBER 1976** 

Code 256

# LANDSAT-1 AND LANDSAT-2 **FLIGHT EVALUATION REPORT** 23 APRIL 1976 TO 23 JULY 1976

Prepared By **GE LANDSAT OPERATIONS CONTROL CENTER** 

For NATIONAL AERONAUTICS AND SPACE ADMINISTRATION **Goddard Space Flight Center** Greenbelt, Maryland 20771



CSCI









# LANDSAT-1 AND LANDSAT-2 FLIGHT EVALUATION REPORT 23 APRIL 1976 TO 23 JULY 1976

Prepared By
GE LANDSAT OPERATIONS CONTROL CENTER

For

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Goddard Space Flight Center
Greenbelt, Maryland 20771

Contract NAS5-21808

APPROVED:

Thomas W. Winchester

Thomas W. Windester



SPACE DIVISION

Valley Forge Space Center
P. O. Box 8555 • Philadelphia, Penna. 19101

GENERAL 🍪 ELECTRIC

# TABLE OF CONTENTS

Section		Page
	INTRODUCTION	vii
1	SUMMARY - LANDSAT-1 OPERATIONS	1-1
2	ORBITAL PARAMETERS	2-1
3	POWER SUBSYSTEM · · · · · · · · · · · · · · · · · · ·	3-1
4	ATTITUDE CONTROL SUBSYSTEM	4-1
5	COMMAND/CLOCK SUBSYSTEM	5 <b>-1</b>
6	TELEMETRY SUBSYSTEM	6-1
7	ORBIT ADJUST SUBSYSTEM	7-1
8	MAGNETIC MOMENT COMPENSATING ASSEMBLY	8-1
9	UNIFIED S-BAND/PREMODULATION PROCESSOR	9-1
10	ELECTRICAL INTERFACE SUBSYSTEM	10-1
11	THERMAL SUBSYSTEM	11-1
12	NARROWBAND TAPE RECORDERS	12-1
13	WIDEBAND TELEMETRY SUBSYSTEM	13-1
14	ATTITUDE MEASUREMENT SENSOR	14-1
15	WIDEBAND VIDEO TAPE RECORDERS	15-1
16	RETURN BEAM VIDICON	16-1
17	MULTISPECTRAL SCANNER SUBSYSTEM	17-1
18	DATA COLLECTION SUBSYSTEM	18-1
APPENDIX A -	- LANDSAT-1 ANOMALY LIST	A-1
APPENDIX B -	- LANDSAT-1 SPACECRAFT ORBIT REFERENCE TABLES	B-1
APPENDIX C -	- LANDSAT-1 DOCUMENTS ISSUED THIS REPORT PERIOD	C-1

# LIST OF ILLUSTRATIONS

rigure		Page
2-1 2-2	Effect of Orbit Adjusts on Landsat-1 Ground Track	2-3 2-4
3-1 3-2 3-3 3-4	Midday Solar Array Current	3-3 3-4 3-5 3-7
4-1 4-2 4-3	Landsat-1 Freon History (Telemetry Values)	4-4 4-5 4-6
5-1 5-2	Landsat-1 Spacecraft Clock Drift History	5-2 5-3
9-1 9-2	USB Power Output History (Landsat-1)	9-3 9-4
11-1	Landsat-1 Sensory Ring Thermal Profile	11-5
13-1	WPA-2 (Link 3) AGC Readings at Goldstone with 30' Antenna (Landsat-1)	13-1
17-1 17-2 17-3	Computer Map of MSS Scenes for First Three Years Operation - Landsat-1 MSS Scenes Imaged in Fourth Year MSS Scenes Imaged This Quarter	17-3 17-5 17-7

LS-1

# LIST OF TABLES

Table		Page
1-1	In-Orbit Payload System Performance Launch Thru Orbit 20342 (7/21/76)	
	Landsat-1	1-2
2-1	Landsat-1 Brouwer Mean Orbital Parameters	2-2
3-1	Landsat-1 Major Power Subsystem Parameters	3-9
3-2	Landsat-1 Power Subsystem Analog Telemetry (Average Value for Data Received in NBTR Playback)	3-11
		4.0
4-1 4-2	Landsat-1 ACS Temperature and Pressure Telemetry Summary	4-2 $4-3$
4-3	Landsat-1 ACS Attitude Errors and Driver Duty Cycle	4-3
1-0	Dandsat-I Aos Attitude Elifors and Driver Duty Oyole	4-0
5-1	Landsat-1 Command Clock Telemetry Summary	5-4
6-1	TLM Telemetry Summary	6-1
7-1	Landsat-1 Orbit Adjust Summary	7-2
7-2	Landsat-1 OAS Telemetry Values	7-2
8-1	MMCA Telemetry Summary (Landsat-1)	8-1
9-1	Landsat-1 USB/PMP Telemetry Values	9-2
10-1	Landsat-1 APU Telemetry Functions	10-1
11-1	Landsat-1 Thermal Subsystem Analog Telemetry (Average Value of Frames for	
11 0	Data Received in NBTR Playback)	11-3
11-2	Landsat-1 Compensation Load History	11-6
12-1	NBR Operating Hours by Modes, Landsat-1	12-1
12-2	Narrowband Tape Recorder Telemetry Values, Landsat-1	12-1
13-1	Wideband Modulator Telemetry Values, Landsat-1	13-2
14-1	Landsat-1 AMS Temperature Telemetry	14-1
15-1	WBVTR-1 Telemetry Values	15-1
17-1	MSS Telemetry Values	17-9
17-2	MSS Response History - Landsat-1	17-10

# INTRODUCTION

This is the seventeenth report in a continuing series of documents issued at launch, and thereafter quarterly, to present flight performance analysis of the Landsat-1 Spacecraft. Previously issued documents are:

72SD4255	ERTS-1 Launch and Flight Activation Evaluation Report 23 to 26 July 1972	18 October 1972
72SD4262	ERTS-1 Flight Evaluation Report 23 July 1972 to 23 October 1972	28 November 1972
72SD4224	ERTS-1 Flight Evaluation Report 23 October 1972 to 23 January 1973	27 February 1973
73SD4249	ERTS-1 Flight Evaluation Report 23 January 1973 to 23 April 1973	29 May 1973
73SD4260	ERTS-1 Flight Evaluation Report 23 April 1973 to 23 July 1973	10 August 1973
73SD4274	ERTS-1 Flight Evaluation Report 23 July 1973 to October 1973	28 November 1973
74SD4205	ERTS-1 Flight Evaluation Report 23 October 1973 to 23 January 1974	26 February 1974
74SD4217	ERTS-1 Flight Evaluation Report 23 January 1974 to 23 April 1974	18 May 1974
74SD4236	ERTS-1 Flight Evaluation Report 23 April 1974 to 23 July 1974	<b>1</b> 5 August 1974
74SD4255	ERTS-1 Flight Evaluation Report 23 July 1974 to 23 October 1974	31 December 1974
75SDS4222	Landsat-1 Flight Evaluation Report 23 October 1974 to 23 January 1975	30 April 1975
75SDS4228	Landsat-1 and Landsat-2 Flight Evaluation Report 23 January 1975 to 23 April 1975	15 August 1975
75SDS4255	Landsat-1 and Landsat-2 Flight Evaluation Report 23 April 1975 to 23 July 1975	10 October 1975
75SDS4266	Landsat-1 and Landsat-2 Flight Evaluation Report 23 July 1975 to 23 October 1975	1 December 1975
76SDS4207	Landsat-1 and Landsat-2 Flight Evaluation Report 23 October 1975 to 23 January 1976	29 February 1976
76SDS4248	Landsat-1 and Landsat-2 Flight Evaluation Report 23 January 1976 to 23 April 1976	14 July 1976

This report contains analysis of performance for Orbits 19100 to 20370 for Landsat-1.

#### SUMMARY LANDSAT-1 OPERATIONS

Landsat-1 continues to perform its mission nominally.

The Landsat-1 spacecraft was launched from the Western Test Range on 23 July 1972, at 18:08:06.508Z. The launch and orbital injection phase of the space flight was nominal and deployment of the spacecraft followed predictions. Orbital operations of the spacecraft and payload subsystems were satisfactory through Orbit 147. 3 August 1972. after which an internal short circuit disabled one of the Wideband Video Tape Recorders (WBVTR-2). Operations resumed until Orbit 196, 6 August 1972, when the Return Beam Vidicon failed to respond when commanded off. The RBV was commanded off via alternate commands. Landsat-1 continued to perform its imaging mission with the Multispectral Scanner and the remaining Wideband Video Tape Recorder providing image data. The remaining Wideband Tape Recorder experienced four suspensions of operation, the last being in Orbit 9881 on 2 July 1974, and has not been used operationally since. In Orbit 4396, 3 June 1973, an integrated circuit chip in the TMP failed, disabling four TLM functions. COMSTOR "B" has an intermittent problem with cell 12, which is not being used operationally. The "B" section of the USB with full power output of 1,5 watts was substituted for the "A" section in Orbit 10068, 15 July 1974, because of excessive decline of transmitter power. The pitch flywheel stopped for 2 minutes in Orbit 8040, 20 February 1974; and for 8 hours, 2 minutes in Orbits 11125 to 11130, 29 September 1974. It has been kept close to zero speed ever since, using pitch-bias control. The RMP was switched from B to A in Orbit 11257, 8 October 1974, as a precautionary measure after RMP B began showing current variations. The DCS subsystem was turned off after Orbit 12690, 19 January 1975, and the function assumed by DCS in Landsat-2. Narrow Band Recorder 2 became noisy and was turned off in Orbit 13015, 12 February 1975. Operation of NBR 2 resumed in Orbit 14116, 2 May 1975, until failure in Orbit 15253, 22 July 1975, when its operation was terminated. Battery 6 was turned off between Orbits 13346, 7 March 1975, and 14100, 30 April 1975, due to electrical characteristics causing high temperatures. Between Orbits 14780, 18 June 1975 and 15467, 6 August 1975, Battery 6 was turned off again due to high temperature. Because high current transient occurred at Battery 6 turn on in Orbit 15467, 6 August 1975, the battery turn-on command is temporarily suspended from use. Battery 8 was turned off in Orbit 15588, 15 August 1975, due to electrical characteristics causing high temperature and will not be returned to service because of the battery "ON" command problem. The pitch flywheel stopped again for 45 minutes in Orbit 15309, 26 July 1975, and 3 minutes in Orbit 15312, 26 July 1975. Pitch flywheel motor driver duty cycle remained high from Orbit 15191, 18 July 1975 to Orbit 15393, 1 August 1975, when it returned to normal. MSS operation was suspended during the pitch flywheel anomaly between Orbit 15309, 26 July 1975, and 15393, 1 August 1975. The rear ACS scanner had intermittent electrical failures beginning in Orbit 19078, 21 April 1976, and it failed in Orbit 19086, 22 April 1976. The spacecraft was switched to single scanner mode (forward scanner) in Orbit 19089, 22 April 1976, and normal ACS operation resumed. See Table 1-1 for a summary of payload in-orbit operation.

Table 1-1. In-Orbit Payload System Performance Launch Thru Orbit 20342 (7/21/76) Landsat-1

<del></del>		
RBV	Total Scenes Imaged	1690
	AVG. Scenes/Day	139
	Total Area Imaged (millions of sq. mi.)	14.7
İ	ON TIME (hr.)	14.0
	ON/OFF Cycles	91
	% Real Time Images	57
	% Recorded Images	43
MSS	Total Scenes Images	240, 973
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	AVG. Scenes/Day	174
	Total Area Imaged (millions of sq. n. mi.)	2101
M	ON TIME (hr.)	2,499.4
	ON/OFF Cycles	17, 505
	% Real Time Images	81
	% Recorded Images	19
_ ~~		
DCS	Messages at OCC	1, 152, 045
	Non-Perfect MSGS	90, 691
	Max. DCP's ACTIVE/DAY	114
	Users	44
	Avg. MSG/ACTIVE Orbit	181
	ON TIME (hr.)	21, 820, 2
WPA-1	% Real Time Mode	55
	% Playback Mode	45
	ON TIME (hr.)	31.9
	ON/OFF Cycles	312
WPA-2	% Real Time Mode	62
WIA-A	% P/B Mode	38
	ON TIME (hr.)	2,405.2
	ON/OFF Cycles	15, 267
	•	
WBVTR-1	% Record Mode	38
	% Playback Mode	41
	% Rewind Mode	21
	% Standby Mode	1
	Minor Frame Sync Error Count in P/B	Failed Orbit 9, 881
	Time Head-Tape Contact (hr.)	732.8
	Cycles Head-Tape Contact	11, 954
	ON TIME (hr.)	927.6
WBVTR-2	% Record Mode	38
	% Playback Mode	41
	% Rewind Mode	20
	% Standby Mode	1
	MFSE Count in P/B	Failed Orbit 148
the second second	Time Head-Tape Contact (hr.)	5.1
	Cycles Head-Tape Contact	44
	ON TIME (hr.)	6.5

#### ORBITAL PARAMETERS

The initial orbit of Landsat-1 required some correction at Orbits 38, 44, and 59 to achieve the desired 18-day repeat cycle. During Orbits 938, 2416, 6390 and 7826 it was necessary to fire the -X thruster of the orbit adjust system to maintain the ground trace in the desired 18-day repeat pattern of ± 10 nm. On September 29, 1974, the ACS control system fired gas during the spacecraft emergency (pitch flywheel stoppage) which resulted in an unplanned orbit change similar to firing the -X thrusters. The +X thruster was fired during Orbits 11367, 11464, 13611, 19747 and 19871 in order to maintain the 18-day repeat cycle ground trace within ± 10 nm. Two of the +X firings, i.e., 19747 (8 June 1976) and 19871 (17 June 1976) occurred during this report period.

The orbital parameters are given in Table 2-1. Figure 2-1 shows the longitude error as a function of time and orbit maintenance burns. The longitude error has been maintained with  $\pm$  10 nm in the east-west direction at the equator as planned. Figure 2-2 shows the change of sun time at the descending node. Appendix B gives ground trace repeat cycle predictions.

Table 2-1. Landsat 1 Brouwer Mean Orbital Parameters

Element	Apogee (km)	Perigee (km)	Inclination (Deg.)	Semi Major Axis (km)	Eccentricity	Two Body Period (Min)	Nodal Period (Min)	Argument of Perigee (Deg)	Right Ascension (Deg)	Mean Anomaly (Deg)
25 Oct 1972	917.3	898.1	99.103	7285.850	0.00132	103.152	103.268	93.721	1.060	86.484
25 Jan 1973	922.3	893.1	99.090	7285.865	0.00200	103.153	103.268	133.693	91,805	52.797
25 Apr 1973	911.056	888.763	99.073	7285.767	0.00073	103.151	103. 267	168.857	181.41 <b>1</b>	11.098
25 Jul 1973	914.341	900, 810	99.068	7285.741	0.00093	103.150	103.266	95.602	268.944	84.301
25 Oct 1973	922,913	893.229	99.056	7285.786	0.00198	103.151	103.266	65.071	0. 291	301.002
25 Jan 1974	915. 873	899. 111	99.041	7285.657	0.00115	103.148	103.264	160. 866	88, 606	19.049
24 Apr 1974	920. 090	912.672	99.023	7285.691	0.000802	103.149	103. 265	117.631	176.743	62.319
23 Jul 1974	922.363	892.629	99.017	7285.661	0. 002041	103.148	103.264	109.225	269. 779	70.540
23 Oct 1974	918.657	896.316	99.004	7285.652	0.00153	103. 148	103. 264	150.750	354.743	29.110
24 Jan 1975	914.18	900.67	98.990	7285.590	0.000928	103.147	103.262	278.848	85, 403	261.138
24 Apr 1975	914.74	900.05	98.972	7285.559	0.001008	103.146	103.262	37.047	<b>17</b> 3, 043	142.764
25 Jul 1975	915.12	899.63	98.964	7285.541	0.001063	103.145	103.261	138.138	262.528	41.661
23 Oct 1975	914.19	900.54	98.951	7285.531	0.000937	103.145	103.261	250.370	349.952	289.612
24 Jan 1976	914.39	900.32	98.936	7285.523	0.000966	103.145	103.261	2.826	80.147	177.049
24 Jan 1976	914.39	900.32	98.936	7285.523	0.000966	103.145	103.261	2.826	80.147	177.049
23 Apr 1976	915.28	899.41	98.919	7285.511	0.001089	103.145	103.261	110.622	167.275	69.142
22 Jul 1976	914.24	900.35	98.911	7285.464	0.000953	103.144	103.260	218.207	254.289	321.741

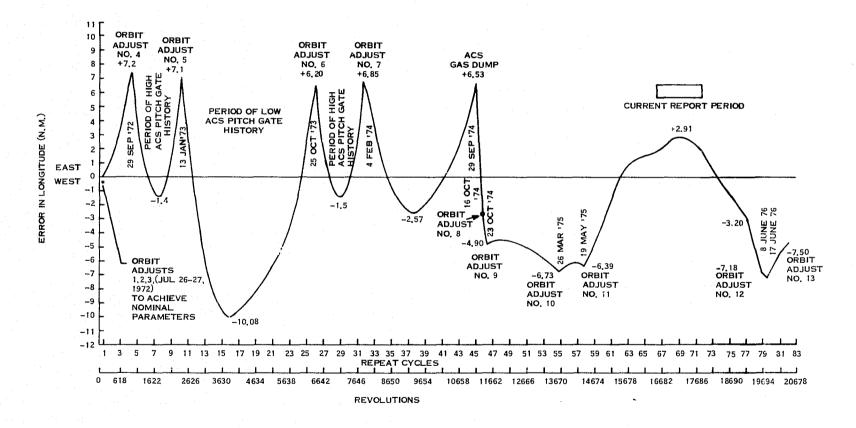


Figure 2-1. Effect of Orbit Adjusts on Landsat 1 Ground Track

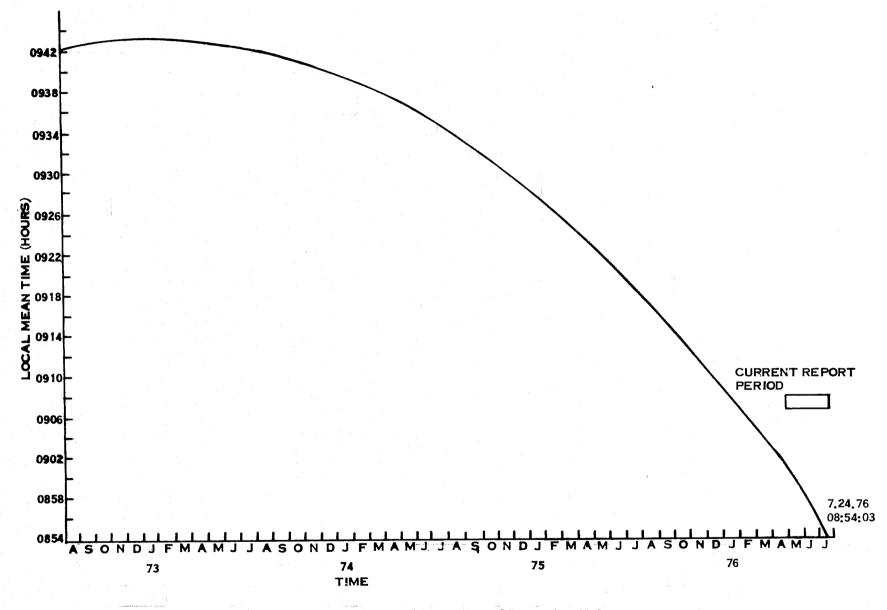


Figure 2-2. Local Mean Time of Descending Node

## POWER SUBSYSTEM (PWR)

The solar array continued to provide excess energy for the payload and spacecraft load throughout this report period. Compensation loads and auxiliary loads dissipated the excess power above the battery and load requirements using Landsat-1 power management procedures. Solar array degradation was 30, 3% at the end of 48 months in orbit. The power subsystem is predicted to have adequate power through 1976 for the present Landsat-1 payload configuration, and may extend to 1977 depending on the electrochemical degradation of the battery packs and the effect of increasing sun angle on array tracking.

A plot of measured and predicted midday solar array current is shown in Figure 3-1. Figure 3-2 shows actual and predicted midday solar array degradation. Figure 3-3 shows actual sun angles to the space-craft and solar panels. Figure 3-4 is a prediction of the variation of sun angle through 1977 for Landsat-1 and 2. It is noted in Figure 3-1 that the high noon solar array current is slightly lower than predicted. This is due to slightly different solar panel sun angles and solar array degradation larger than initially predicted. Solar panel tracking returned to normal in this report period as the sun angle remained below 46°. The solar array current notch of approximately 50° - 60° ma still occurs for a short portion of each satellite day. It does not cause any spacecraft problem as there is still an excess of solar array power as stated earlier.

As of 23 July 1976, the battery system on Landsat-1 has completed 34982 hours of orbital operation. At the completion of about 22970 hours (in Orbit 13346; 7 March 1975) battery 6 was turned off for a restoraction cycle as the battery developed a high C/D ratio, charge share, and temperature. In about 1300 hours, the battery discharged to 26.3 volts (through its small telemetry load) and was restored to service in Orbit 14100, 30 April 1975. However, in the next 1170 hours of operation, the battery showed a recurrence of unhealthy characteristics and was turned off for a second restoration cycle in Orbit 14780, 18 June 1975. The battery discharged to about 26.5 volts in about 1180 hours and was turned on in Orbit 15467, 6 August 1975. The battery turn-on this time was followed by an anomalous time-out of the USB/WPA back-up timer and tripping of the ACS low voltage pneumatics interlock, due to a high transient current occurring simultaneously with the execution of command 353 (all batteries on). The battery, however, has performed satisfactorily since turn-on.

By the time battery 8 was nearing the completion of 26800 hours in orbit, it developed unhealthy characteristics similar to those of battery 6. Therefore, battery 8 was taken off line in Orbit 15588, 15 August 1975. The battery discharged to 26.5 volts in about 1225 hours. Battery 8 turn-on has been deferred to avoid the possible risks involved in the execution of Command 353. The battery probably discharged to zero volts in about 2700 hours (telemetry verification is impossible beacuse the sensor threshold is 19.3 volts).

Since 30 August 1975, the batteries have been kept slightly undercharged to avert the possible recurrence of a run-away condition. Since then, performance of the batteries on line have been good although temperature spread between batteries reached as high as 15.3°C during February 1976 with battery 5 registering the maximum peak temperature of 34.7°C.

The depth of discharge of batteries have typically ranged between 9 and 12%. During the early part of the mission the DOD had peaked up to 15% for individual orbits with heavier payload operation.

As anticipated, battery temperatures have decreased in this report period (see Table 3-1) but are expected to rise in the ensuing months of higher sun intensity and sun angle. Temperature spread between batteries ranged from 5.8 to 7.3° during the current report period. Battery packs averaged a typical 8.0 to 9.0 Depth of Discharge (DOD) with fairly good charge and discharge characteristics for individual batteries.

The power system electronics performed well in this report period with all voltages stable. Table 3-1 shows major power subsystem parameters and Table 3-2 shows power subsystem telemetry for selected orbits. Some parameters in Table 3-2 may slightly different from Table 3-1, because Table 3-1 uses a power management time span (night followed by a day); whereas, the time span used in Table 3-2 is the playback period for the NBR. The Shunt Limiter has not operated since Orbit 3 because the unregulated voltage has been held below cut-in voltage by power management. The spacecraft regulator switched from 2 to 1 on 29 June 1976 due to RF interference triggering an unencoded command switchover. Operation remained normal.

LS-1

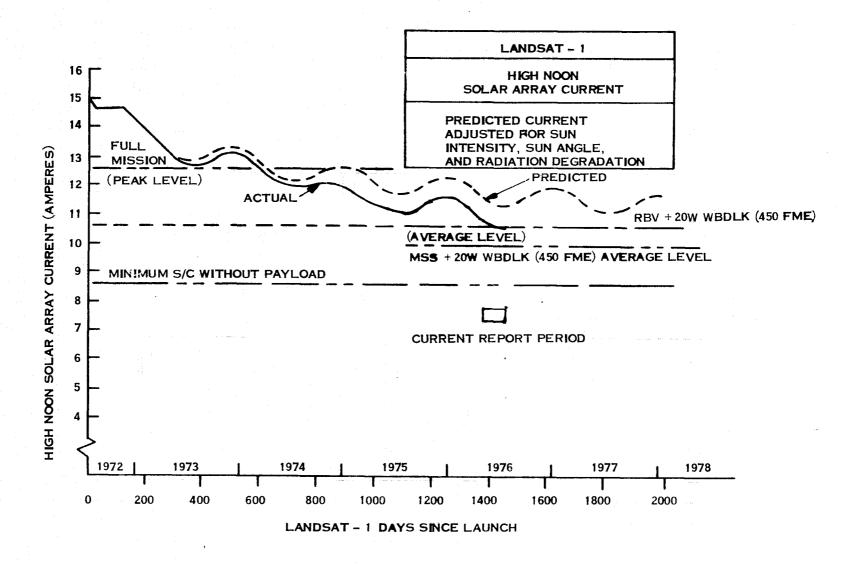


Figure 3-1. Midday Solar Array Current

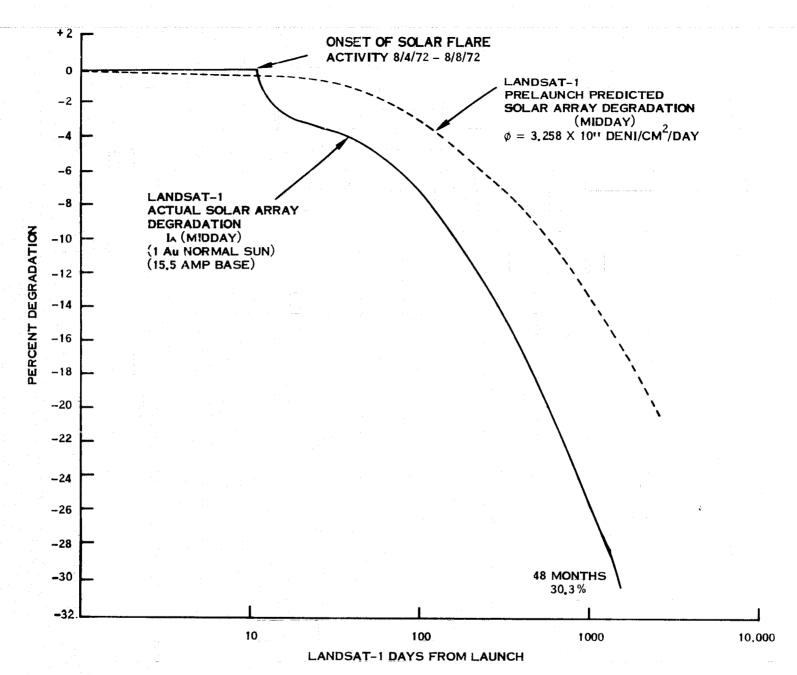


Figure 3-2. IA (Midday) Degradation vs. Days

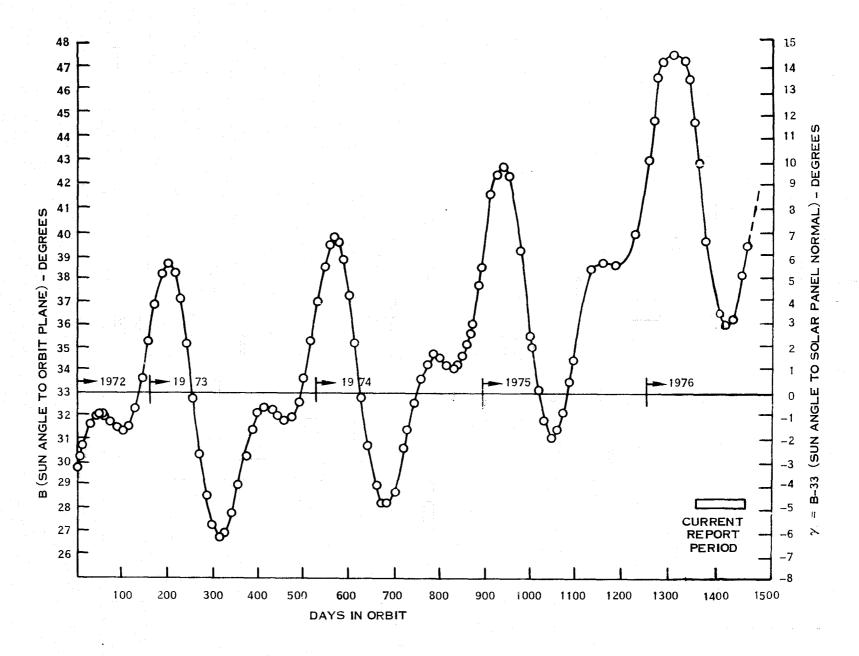
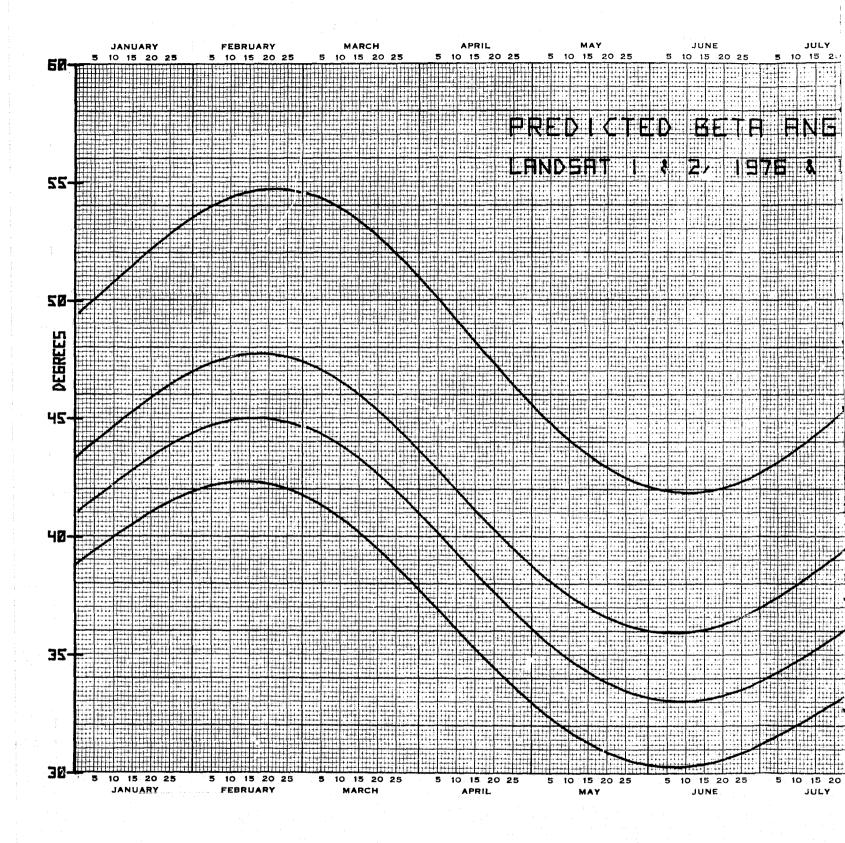


Figure 3-3. Actual  $\beta$  and  $\gamma$  (Paddle) Sun Angles, Landsat-1



FOLDOUT FRAME

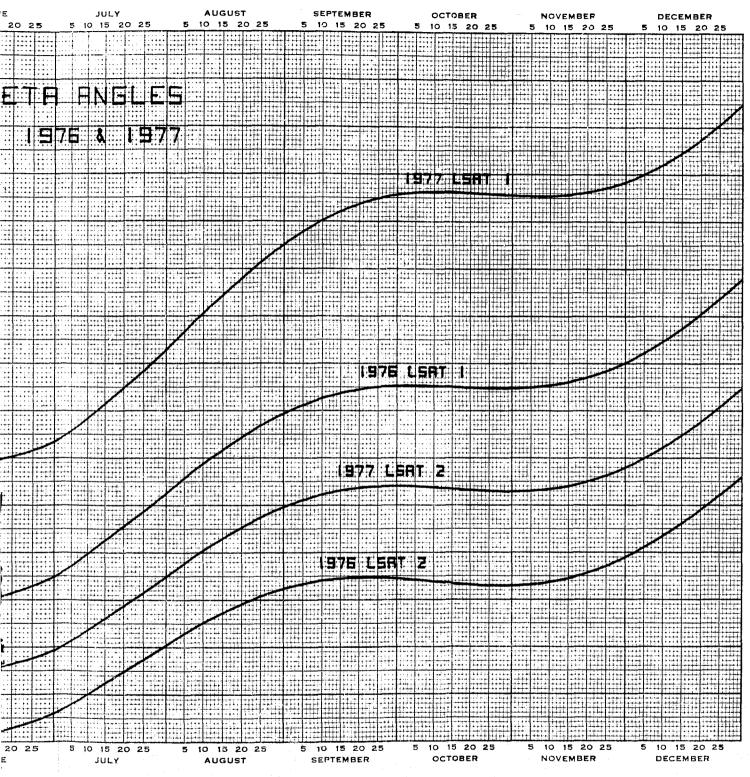


Figure 3-4. Predicted Beta Angles, Landsat 1 & 2, 1976 & 1977

LS-1

3 - 7/8

Table 3-1. Landsat-1 Major Power Subsystem Parameters

ORBIT NO.	26	5098	10178	15254	17853	10519	10045	7
BATT 1 MAX				10204	11000	19513	19945	20363
	32.48	32.91	33,25	33.16	32.14	32.57	32.48	32,48
	32.48	32.91	33.16	33.16	32.05	32.57	32.48	32.48
	32.48	32.99	33,25	33.16	32.14	32, 57	32.48	32.48
4	32.48	32,99	33.25	33.16	32.14	32.57	32. 57	32.48
5	32.48	32.99	33,33	33,25	32,22	32.65	32.57	32. 57
6 **	32.31	32,91	33,25	28.21	32.05	32.57	32.48	32.48
7	32,22	32.91	33.25	33,16	32.14	32.57	32.57	32.48
8 ***	32.14	32,91	33,25	33,16	***	***	***	***
AVERAGE +	32,38	32.92	33.25	33.17	32.13	32, 58	32, 52	32.49
BATT 1 END-	28.81	28.30	28.98	29.15	28.98	29.06	28.64	29.23
2 OF-	28.81	28.30	28.98	29,15	28.98	29.06	28.64	29, 23
3 NIGHT	28.81	28.30	28.98	29.15	28.89	28.98	28.64	29. 23
4 VOLTS	28.89	28.38	28.98	29.15	28.98	29.06	28.64	29.32
5	28.89	28,38	29.06	29,23	29.06	29.15	28.72	29.37
6 **	28,81	28.30	28.98	28.12	28.98	28.98	28.55	29.23
7	28.81	28,30	28.98	29.15	28.98	29.06	28.64	29.23
8 ***	28,81	28.30	28,98	29.15	***	***	***	***
AVERAGE +	28.84	28.32	28,99	29.16	28.97	29.05	28.64	29, 26
BATT 1 (*) CHGE	13.11	13.58	13.96	15.27	13.93	14.49	14.51	14.45
2 SHARE	12.93	13.58	13,96	15.27	13.93	14.49	14. 93	15. 06
3 (%)	11.38	11,38	11.95	13.59	12.91	13.20	13.51	13.26
4	12,39	11.95	12.28	14.06	13.71	14.47	14.54	14. 19
5	12.32	11.85	11.93	13.63	15.13	14.45	14.20	14. 32
6 **	12.80	12.35	11.79	**	16.56	14.60	14.18	14. 59
7	12.62	12,42	12.13	13.59	13.82	14.29	14.10	14. 11
8 ***	12.45	12.10	11.98	14.54	***	***	***	***
BATT 1 LOAD	12,71	12.44	12.58	14.67	13.99	14.30	14.26	14.32
2 SHARE	12.90	13,62	13.70	15.88	14.35	14.56	14.68	14. 89
3 (%)	11.43	11.91	12.23	13.85	13.05	13.24	13.43	<del> </del>
4	12.77	13.01	13.12	14.91	14.54	14.82	14. 97	13.54 14.81
5	12.54	12,42	12.60	4.02	14.85	14.64	14.44	<u> </u>
6 **	12.53	12.21	11.30	**	15.09	14.00	13.77	14.31
7	12.80	12.41	12.50	13.77	14.08	14.39	14.41	13.73 14.36
8 ***	12.32	11.98	11 97	12 99	***	***	***	14. 36

4	12.77	13.01	13.12	14.91	14.54	14.82	14. 97	14.81
5	12.54	12,42	12,60	14.02	14.85	14.64	14.44	14. 31
6 **	12,53	12.21	11.30	**	15.09	14.00	13, 77	13.73
7	12.80	12.41	12.50	13.77	14.08	14.39	14.41	14.36
8 ***	12.32	11.98	11.97	12.88	***	***	***	***
BATT 1 TEMP	21,11	24.65	24.76	23.12	23.23	21.14	20,60	21.47
2 IN	18.74	21.42	20.89	19.32	18.44	17,77	17.40	17.81
3 (°C)	18.77	20.29	20.16	18.77	17.67	17.32	16.86	17.25
4	21.57	23.17	23,32	22.71	22.75	21.99	21.44	21.64
5	21.82	23.85	24.09	23.69	30.66	23.65	22.91	24.40
6 **	21,21	24.37	24.78	22.10	29.06	22,83	22.07	23.52
7	21.41	25.01	24.96	23,75	27.40	22,56	21.80	23, 23
8 ***	21.82	25,14	25.24	24.59	25.49	21.65	21. 24	22.15
AVERAGE	20.81	23.49	23.53	22.26	24.34	21.12	20.54	21.43
S/C REG BUS PWR (W)	176.8	153.4	165.0	137.9	123.1	124.30	124.05	123, 49
COMP LOAD PWR (W) (P/O S/C REG BUS PWR)	49.0	34.8	41.9	29.4	17.4	17.4	17.4	17.4
P/L REG BUS PWR (W)	16.2	13.7	8.9	8.9	9.1	9.13	9.12	9.13
C/D RATIO	1.06	1,13	1,21	1.18	1.07	1.04	1.26	1.04
TOTAL CHARGE (A-M)	309,2	290.21	*258.3	229.29	164.92	183.70	221.39	172.42
TOTAL DISCHARGE (A-M)	290.9	256.28	214.2	194.13	153.49	176.44	176.33	168.31
SOLAR ARRAY (A-M)	1044.0	908.0	832.0	876.0	830.0	760	752	754
S.A. PEAK I (AMP)	15.8	13.68	12.44	11.60	11.68	11.20	11.04	10.88
MIDDAY ARRAY I (AMP)	15.01	12,80	N/A	11.04	11.28	10.72	10.64	10.56
SUN ANGLE (DEG)	-3,33	-3.54	-1.82	1.49	13.35	3 <b>.</b> 5	3.4	6.4
MAX R PAD TEMP (°C)	+62.00	+68.00	63,20	62.0	63.20	59.60	59.60	58.40
MIN R PAD TEMP (°C)	-62.00	-59.00	-42.79	-42.18	-33.68	-40.36	-39.75	-38.54
MAX L PAD TEMP (OC)	+57.90	+60.50	56.00	56.00	63.20	56.00	55, 12	55. 12
MIN L PAD TEMP (°C)	-67.00	-64.00	-47.00	-46.25	-36.11	-44.00	-44.00	-42.18

<sup>\*</sup> After the telemetry failure in Orbit 4396 Battery 2 charge share was taken equal to Battery 1 charge as an approximation in order to derive a charge share value of each battery.

<sup>\*\*</sup> Battery 6 turned off in Orbit 14780 was returned to service in Orbit 15467.

<sup>\*\*\*</sup> Battery was turned off in Orbit 15588 and remained off through the end of this report period,

<sup>+</sup> Average of batteries on-line.

		T				Orbits			· · · · · · · · · · · · · · · · · · ·	
Function	Description	Unit	26	5089	10182	15254	17854	19514	19946	20364
6001	BATT 1 DISC	AMP	0.94	0,81	0.81	0.91	0.75	0.78	0.78	0.81
6002	2		0.95	*	*	*	*	*	*	*
6003	3		0.84	0, 78	0.80	0.86	0.70	0.73	0.74	0.75
6004	4		0.93	6.86	0.86	0,92	0.79	0.82	0.84	0.84
6005	5		0.92	0.82	0,82	0.87	0.81	0.81	0.79	0.79
6006	6++		0.91	0.78	0.72	0.00	0.82	0.79	), 78	0,78
6007	7		0.94	0.82	0.80	0.85	0.76	0.79	0.80	0. 8(
6008	8**		0.91	0.77	0.78	0.80	0.00	0.00	0.00	0.00
6011	BATT 1 CHG	AMP	0,58	0.58	0.69	0.52	0.35	0.38	0.41	0.35
6012	2		0.57	*	*	*	*	*	*	*
6013	3		0.50	0.48	0.60	0.46	0.32	0.35	0, 38	0, 33
6014	4		0.54	0.51	0.60	0.48	0.34	0.37	0.41	0.35
6015	5		0.54	0.50	0.58	0.46	0.37	0.38	0.40	0.35
6016	6 <del>++</del>		0.57	0.52	0.56	0.00	0.40	0.38	0.40	0.35
6017	7		0.55	0.53	0.60	0.46	0.34	0.37	0.40	0.35
6018	8**		0.55	0.52	0.58	0.49	0.00	0.00	0.00	0.00
6021	BATT 1 VOLT	VDC	30.87	31, 24	31.64	31.62	30.84	31.19	30, 93	31.20
6022	2		30.87	31.25	31.66	31.62	30,83	31.18	30, 93	31.19
6023	3		30.87	31.25	31,66	31.62	30.82	31.18	30, 92	31.18
6024	4		30,90	31.28	31.70	31.65	30.86	31, 21	30, 95	31, 22
6025	5		30.95	31.33	31,75	31.71	30.92	31, 26	;1,01	31, 28
6026	6++		30.86	31.24	31.65	28.18	30.82	31.17	30, 92	31, 18
6027	7		30.89	31, 27	31.68	31.64	30.86	31.20	30,95	31, 21
6028	8**		30.89	31, 27	31.68	31, 63		-		_
6031	BATT 1 TEMP	DGC	21.17	24, 48	26.09	23.02	23, 23	21.17	20,63	21.43
6032	2		18.80	21.29	22,81	19,28	18.44	17.83	17.43	17.80
6033	3		18.76	20.17	21.26	18.76	17.56	17.32	16.90	17.21
6034	4		21.57	23.04	23,83	22, 69	22.73	22,00	21.47	21,60
6035	5		21.84	23.77	24.78	23.64	30.63	23, 66	22, 93	24. 36
6036	6++		21,24	24, 27	25.78	22,08	29.03	22, 85	22.11	23.51
6037	7		21.43	24, 88	26.09	23,67	27.41	22.56	21.84	23, 18
6038	8**		21.86	25.02	26,21	24.51	25,53	21.66	21.26	22, 14
6040	RT PAD TEMP	DGC	25, 82	27, 22	27.16	27, 29	33,36	26.79	27.90	28.21
6041	R PAD V N	VDC	33.40	33, 85	34, 36	34, 18	31.71	33, 35	33, 10	33.06
6042	R PAD V M	VDC	33.29	33, 50	33.60	32,92	31.03	31.97	31.85	31, 75
6044	LT PAD TEMP	DGC	14.14	16, 61	19.11	19.84	28.96	20.75	21.76	22.62
6045	L PAD V F	VDC	33,69	34, 16	34.67	34.63	33.44	34.00	33,71	33, 84
6046	L PAD V G	VDC	33,63	34, 19	34.72	34.68	33.47	34.04	33.76	33, 88

T. A.			- L. 10	20,72		~ i. 01	~1), elej		21,26	22, 14
6040	RT PAD TEMP	DGC	25, 82	27, 22	27,16	27, 29	35,36	26, 79	27, 90	28, 21
6041	R PAD V N	VDC	33.40	33, 85	34.36	34, 18	31.71	33, 35	33, 10	33, 06
6042	R PAD V M	VDC	33.29	33, 50	33.60	32.92	31.03	31, 97	31,85	31.75
6044	LT PAD TEMP	DGC	14.14	16,61	19.11	19.84	28,96	20.75	21.76	22,62
6045	L PAD V F	VDC	33,69	34, 16	34,67	34,63	33,44	34.00	33.71	33, 84
6046	L PAD V G	VDC	33,63	34, 19	34,72	34,68	33.47	34.04	33.76	33, 88
6050	s/c ur bus v	VDC	31,24	31.68	32.60	32.07	31.25	31, 58	31, 36	31, 61
6051	S/C RG BUS V	VDC	24, 54	24, 55	24,55	24, 54	24,54	24.54	24, 54	24. 55
6052	AUX REG A V	VDC	23.41	23, 48	23,47	23,49	23,48	23.49	23,48	23, 49
6053	AUX REG B V	VDC	23.50	23, 50	23,50	23, 50	23, 50	23.50	23,50	23,50
6054	SOLAR I	AMP	14.87	12.69	11.60	10.83	10.74	10.41	10.36	10.17
6055+	S/C RG BUS I	AMP	7.11	6.27	6.80	5, 63	5,03	5.07	5.06	5.04
6056+	S/C RG BUS I	AMP	7.11	6.27	6.79	5.62	5.02	5,06	5.05	5,02
6058	PC MOD T 1	DGC	21.82	22, 23	23,22	20.63	19.75	19.47	19.26	19.54
6059	PC MOD T 2	DGC	21.68	22, 53	23.00	21,17	20.54	20, 21	20.01	20.14
6070	P/L RG BUS V	VDC	24,66	24.68	24.68	24.68	24.66	24.67	24.66	24,67
6071	P/L UR BUS V	VDC	31,08	31, 53	31.92	31, 92	31.08	31.43	31.20	31.45
6072+	P/L RG BUS I	AMP	0.57	0. 56	0.36	0.36	0.38	j <b>.</b> 37	0.37	0, 37
6073	P AUX A V	VDC	23.51	23, 51	23.50	23, 50	23.50	20, 50	23.50	23.50
6074	P AUX B V	VDC	23,51	25, 51	23, 50	23,50	23.50	23, 50	23, 50	23, 50
6075	PR MOD T 1	DGC	21,50	23.13	23,62	21.44	21.14	20. 75	20, 52	20, 69
6076	PR MOD T 2	DGC	20.34	21. 45	21.84	19.88	19.84	19.37	19, 24	19.35
6079	FUSE BLOW V	VDC	24, 56	24, 57	24.60	24.59	24.57	24.58	24, 57	24.58
6080	SHUNT 1 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6081	SHUNT 2 I	AMP	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00
6082	SHUNT 3 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6083	SHUNT 4 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6084	SHUNT 5 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6085	SHUNT 6 I	AMI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6086	SHUNT 7 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6087	SHUNT 8 I	AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6100	P/L RG BUS I	AMP	0.58	0,56	0.36	0.36	0.38	0.37	0.37	0.37
Total No.	MAJOR FRAMES	FRM	764.0	389.0	384.0	785	787	785	793	788

<sup>\*</sup>Function 6002, 6012; missing data resulted from disabled telemetry resulting from IC chip failure which affected charge current directly and discharge current indirectly.

<sup>+</sup>FUNC 6055, 6056, 6072 data is derived from Pseudo FUNC 6155, 6156, 6172 used after change to Mode 11.

<sup>++</sup>Battery 6 turned off in Orbit 14780 was returned to service in Orbit 15467.

<sup>\*\*</sup>Battery 8 was turned off in Orbit 15588 and remained off through the end of this report period.

#### ATTITUDE CONTROL SUBSYSTEM (ACS)

Landsat-1 separated from the Delta Vehicle on 23 July 1972 at 19:06:35 GMT. The ACS system acquired attitude at 19:07:32 GMT ( $T_0 + 57$  Min.) in Pitch, 19:08:02 GMT ( $T_0 + 87$  Min.) in Roll and 19:09:15 GMT ( $T_0 + 100$  Min.) in Yaw. ( $T_0 = 80$  separation time = 19:06:35 GMT.)

Pneumatics expended during acquisition was estimated at 0:52 lb sec in Pitch, 0.12 lb sec in Roll and 0.28 lb sec in Yaw.

After acquisition, all systems functioned within their predicted limits with the exception of the Right Forward Sun Sensor which reached a maximum temperature of 60°C (45°C predicted).

ACS performance through Orbit 2149 (24 December 72) was normal. Commencing with Orbit 2150 (24 December 72) Pitch Flywheel anomalies of varying severities and durations occurred; historically, in Orbits 2150 (24 December 72), 8040 (20 February 74), 9887 (2 July 74) to 9910 (4 July 74), 11125 (29 September 74), 15191 (18 July 75), 15304 (29 July 75), 16557 (24 October 75) to 16613 (28 October 75) and 19060 (20 April 76).

After the Pitch flywheel malfunction in Orbit 11125, gravity gradient torques were substantially utilized to unload spacecraft Pitch axis momentum. The ACS was operated in the Normal mode only during the daily consecutive orbits of MSS activity. While in the Normal mode, pneumatics were limited to a single momentary enable near satellite midnight. In Orbits of non-MSS activity, the ACS was commanded into the Roll Diff Tach High Gain (RDTHG) mode and pneumatics were completely disabled. In order to prevent the Pitch flywheel from seizing at high rate, its speed was limited between -10 RMP and -100 RPM by commanding  $\pm$  0.6° PPB as required, except during periods of MSS operations.

Presently (Orbit 20370, 23 July 76) Pitch flywheel duty cycle has been averaging less than 5% in both rotational directions.

A slow pressure leak in the Forward Scanner was detected in Orbit 5099 (24 July 73); however, it has had no effect on the scanner's performance. During this report period, Forward Scanner pressure has decreased from 2.61 psia in Orbit 19102 (23 April 76) to 2.56 psia in Orbit 20420 (26 July 76). Generally, all space-craft pressures and temperatures are satisfactory.

During Orbit 11257 (8 October 74), current variations appeared in RMP #2. RMP #1 was substituted as the prime subsystem and has been functioning normally.

Landsat-1 Sun Sensors were affected by a seasonably high Beta angle between 4 February 1976 (Orbit 17993) and 2 March 1976 (Orbit 18369) and Solar Array tracking deteriorated when the ACS was in Normal mode. A tracking error of up to 48° (leading) built up in the Right Solar Array while the Left Solar Array lagged normal position by 7° to 10°.

The SADS are currently operating normally and the sun sensors are tracking the sun accurately with Beta angle at 39.5° (23 July 1976).

On June 8, 1976, Beta angle passed through 36°. This is the lowest value it will ever be for the remainder of Landsat-1's life.

Beta angle will continue to increase cyclically and when it is approximately  $43.5^{\circ}$  (August 27, 1976) - with the ACS in Normal mode - sun sensor input will diminish and solar array tracking will degrade.

In orbit 19089 (22 April 1976), the ACS was commanded into the Forward Single Scanner mode after the Rear Scanner performed erratically for several orbits.

ACS performance in this mode has been normal and spacecraft attitude is being maintained accurately.

Early in Landsat-1's life, it was observed that pneumatic gating frequency was related to the seasons of the year. Maximum +Pitch and -Roll rating occurred during January, while minimum gating occurred in June.

Currently, pneumatic gating is limited to a single momentary enable per orbit at satellite midnight providing the ACS is in the Normal mode. Segmented NBTR coverage is scheduled for these times and all gating is recorded.

Figure 4-1 is a graph of freon tank pressure as a function of time.

Figure 4-2 predicts Landsat-1's remaining freon life as a function of gating frequency and Figure 4-3 plots remaining Roll gates as a function of tank pressure.

Tables 4-1, 4-2 and 4-3 are a summary of Landsat-1's Attitude Control Subsystem Telemetry.

Table 4-1. Landsat-1 ACS Temperature and Pressure Telemetry Summary

					Orbit				
Function	Units	31	5099	10182	15254	17826	19514	19946	20364
1084 RMP 1 Gyro Temperature	DGC	44.5	23,06	21.22	42.40	43,32	42,09	42,03	41.47
1094 RMP 2 Gyro Temperature	DGC	74.3	75,10	43, 45	24.05	25,68	44.13	23,88	23,49
1222 SAD RT MTR HSING Temp	DGC	21, 1	22.00	20,55	22.89	23.57	22.39	22,29	21,70
1242 SAD LT MTR HSING Temp	DGC	27,0	30.38	28, 18	29.53	31.31	29.49	29.24	28,88
1223 SAD RT MTR WNDNG Temp	DGC	25.3	26.54	24.63	27,06	27.15	26.54	26.54	25.74
1243 SAD LT MTR WNDNG Temp	DGC	28.7	32,92	30.32	31.98	33.91	32,10	31,90	31,40
1228 SAD RT HSG Pressure	PSI	7.6	7.35	7, 12	6,88	6.80	6.71	6,70	6.70
1248 SAD LT HSG Pressure	PSI	7.0	6.86	6.47	6, 18	6.iú	5,93	5,92	5.90
1007 FWD Scanner MTR Temp	DGC	19,8	19,88	18,46	20,36	20.67	19.74	19.64	19.16
1016 Rear Scanner MTR Temp	DGC	20.5	19.83	17,86	19, 24	20,19	19,50	19,35	18.87
1003 FWD Scanner Pressure	PSI	4.6	4.02	3,50	3,00	2.80	2,60	2.60	2.60
1012 Rear Scanner Pressure	PSI	7.8	7.87	7,44	6, 97	6,96	6.74	6.74	6.74
1212 Gas Tank Pressure	PSI	1988.0	1702.34	1454.19	235, 44	186.06	161,71	161,42	162.92
1210 Gas Tank Temperature	DGC	22.6	24,30	22,56	24.36	25,30	23.88	23,77	23.22
1213 Manifold Pressure	PSI	56.7	57,44	58.73	61,67	61.67	61,67	61.67	61,66
1211 Manifold Temperature	DGC	21,9	23,62	21.77	23.82	24.97	23.41	23,16	22.69
1059 CLB Power Supply Card Temp	DGC	37.1	40,54	38, 83	40.58	41.66	40.26	40.00	39.55
1260 ACS Baseplate 1	DGC	25,4	27.93	25, 36	26, 54	28.57	26.62	26.38	26.01
1261 ACS Baseplate 2	DGC	22.9	24.73	23.00	25,05	26,65	24.83	24.68	24.21
1262 ACS Baseplate 3	DGC	23,4	23,69	21,97	24,95	26.00	24.65	24.45	23,89
1263 THO1 STS	DGC	-6.8	-0.97	-3,41	1,22	7.58	2.58	2,12	1.86
1264 THO2 STS	DGC	-14.6	-9,42	-8, 27	-4.50	1.74	- 2.99	- 3.32	- 3, 17
1265 THO3 STS	DGC	-3,1	9,31	7.58	12,92	19.67	14.55	14.52	15.02
1266 THO4 STS	DGC	-13,9	2,85	-1, 85	2,40	7.06	3,32	3.43	3.05
1267 THO5 STS	DGC	-8.9	-1, 16	-5, 17	2,92	13,56	5,84	5.02	4.80
1224 SAD R FSST	DGC	39, 5	60,21	63.25	64.74	64.16	65.23	64.40	62.86
1244 SAD L FSST	DGC	27.1	51, 11	53, 21	54.69	59,65	55,68	53,32	53,22

<sup>\*</sup>Pressure DROP due to PCM count step, not to loss of freon

Table 4-2. Landsat-1 ACS Voltages and Currents

		Örbit								
Function	Units	31	5099	10182	15254	17826	19514	19946	20364	
1057 CLB Power Supply Volts	TMV	2.8	2.78	2.78	2.78	2.78	2.77	2,77	2,77	
1081 RMP 1 MTR Volts	VDC	OFF	OFF	OFF	-30.14	-30.14	-30,14	-30, 14	-30.14	
1082 RMP 1 MTR Current	Amps	OFF	OFF	OFF	.11	0.11	0.11	0.11	0.11	
1080 RMP 1 Supply Volts	VDC	OFF	OFF	OFF	-23.78	-23,76	-23.78	-23,78	-23.79	
1091 RMP 2 MTR Volts	VDC	-29.7	-29,63	-29.63	OFF	OFF	OFF	OFF	OFF	
1092 RMP 2 MTR Current	Amps	0.10	0.10	0.11	OFF	OFF	OFF	OFF	OFF	
1090 RMP 2 Supply Volts	VDC	-23.4	-23,41	-23.50	OFF	OFF	OFF	OFF	OFF	
1320 SAD RT MTR WNDNG Volts	VDC	-4.8	-4.25	-3, 89	-3.85	-3,65	-3.96	-4.26	-4.20	
1240 SAD LT MTR WNDNG Volts	VDC	-4.8	-4.09	-3,36	-3.43	-3.37	-3,56	-3,65	-3,65	
1227 SAD RT -15 VDC Conv.	VDC	14.9	14.88	14.89	14.87	14.87	14.87	14.87	14.87	
1247 SAD LT -15 VDC Conv.	VDC	15.2	15, 13	15.14	15.06	15,10	15.10	15.11	15,11	
1056 CLB <u>+</u> 6 VDC	TMV	2.4	2,35	2,35	2.35	2.35	2.35	2.35	2,35	
1055 CLB + 10 VDC TMV	TMV	2.75	2.75	2,74	2.74	2,74	2,74	2.73	2,73	

Table 4-3. Landsat-1 ACS Attitude Errors and Driver Duty Cycle

			Orbits									
	Function	Units	13198	13569	14001	15254	17826	19514	19946	20364		
	1141 Pitch Fine-Error	DEG	- 0,40	- 0.08	- 0.02	- 2,13	0.80	- 0.40	- 0.45	- 0,11		
	1143 Pitch Flywheel Speed	RPM	- 10, 49	- 26.86	- 1.21	12.92	- 66.00	- 85.52	- 85,32	- 76.17		
	1038 Pitch MTR DRVR CCW	PCT	4.96	5. 81	4.55	3.28	2,52	2.80	2,69	2.69		
	1039 Pitch MTR DRVR CW	PCT	2.29	2.17	5.10	19.65	0,58	1.29	1,35	1.04		
	1030 Roll Fine Error ••	DEG	- 2.25	- 0.20	- 0.20	- 2.52	- 2,86	- 2.63	- 2.71	- 2.70		
	1127 Roll Rear Flywheel Speed	RPM	715.78	756.92	782,08	714.05	734.39	718.05	721.49	720,23		
	1126 Roll Fwd Flywheel Speed	RPM	641,82	674.47	693.31	641.32	643.76	641.26	641,16	640.80		
	1022 Roll Rear MTR DRVR CCW	PCT	0.01	0.68	0.90	.13	0.00	1.07	1,30	0.96		
	1025 Roll Rear MTR DRVR CW	PCT	4.26	5,22	5,52	4.17	4.57	5,73	5.80	5,61		
	1023 Roll Fwd MTR DRVR CCW	PCT	0.01	0.66	0.72	.08	0.00	1.10	1,29	0.99		
	1024 Roll Fwd MTR DRVR CW	PCT	4.15	4.94	5,35	4.24	4.11	5,26	5,28	5.16		
	1035 Yaw Tach	RPM	-206.08	-116.50	- 93,72	-169.52	-199.31	-206.53	-198.81	-200.01		
	1033 Yaw MTR DRVR CW	PCT	0.04	1,53	1.84	.09	0.05	0.09	0.09	0.05		
	1034 Yaw MTR DRVR CCW	PCT	0,07	1.60	1,76	. 68	0.57	0.74	0.72	0.67		
	1221 SAD Right Tach	DEG/MIN	3.37	3.37	2,81	3.37	3.41	3,39	3.38	3,40		
	1241 SAD Left Tach	DEG/MIN	2.80	2.81	2.81	2.79	2,76	2.79	2,79	2,79		

NOTE: Tabulation of these functions began after the pitch flywheel anomaly (stopped) in Orbit 11125.

\* Pitch Fine Error is high due to use of Pitch Position Bias (PPB) to control Pitch wheel speed on some orbits which raise the average error above that of normal attitude without PPB.

<sup>\*\*</sup>Roll Fine Error is high due to use of High Gain Roll Differential Tachometer mode to control Roll wheel speed which raises the average error above that of normal attitude in Normal Gain Roll Differential Tachometer mode.

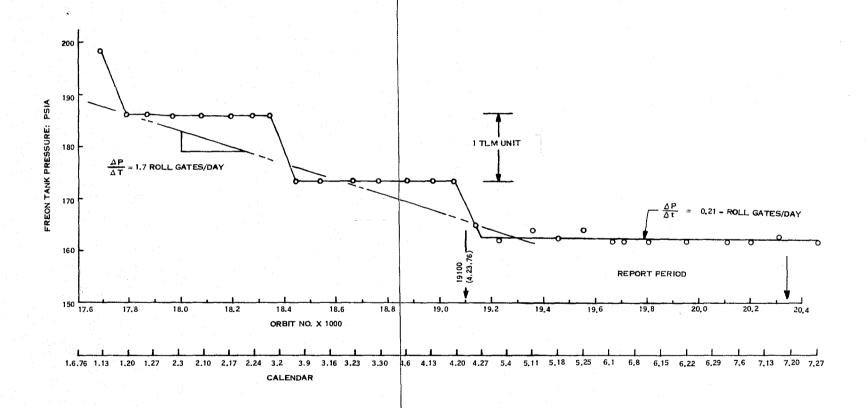


Figure 4-1. Landsat-1 Freon History (Telemetry Values)

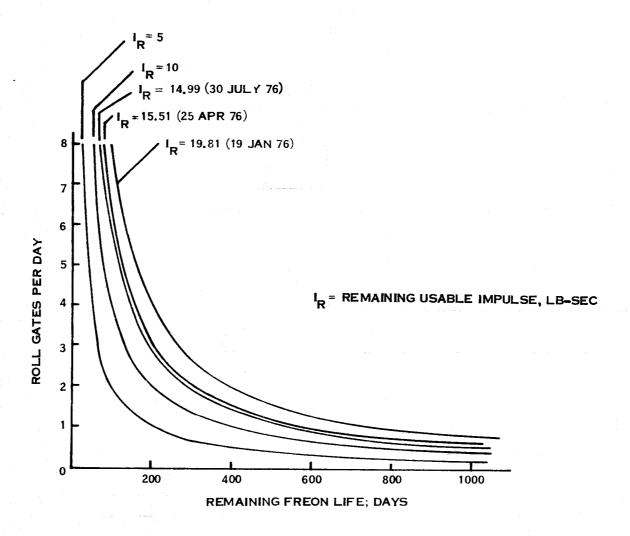


Figure 4-2. Remaining Freon Life vs. Gating Frequency

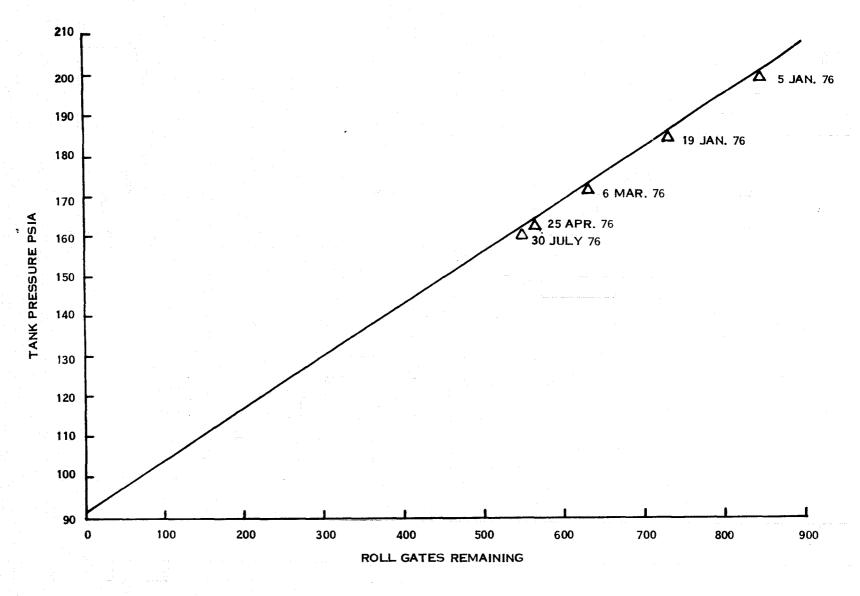


Figure 4-3. Landsat-1 Pressure Roll Gate Prediction

# COMMAND CLOCK SUBSYSTEM (CMD)

The Command Clock subsystem has operated normally throughout the four years in orbit, with the exception of cell 12 in Comstor "B" (incorrect time tags occurred August 3, 1972). Missed commands were ocasionally noted but they were well within the expected probability for the equipment.

The Command Clock Subsystem operated nominally in this report period. A clock update was made in Orbit 19844. Figure 5-1 shows the history of the S/C clock drift since launch.

Figure 5-2 shows the cumulative drift since launch (15.65 seconds slower in 48 months). The rate of drift averaged 0.786 msec slow per orbit. In this period, the drift rate appears to be declining, and is at the average rate of 0.423 msec slow per orbit.

Table 5-1 shows typical telemetry values since launch. All are nominal.

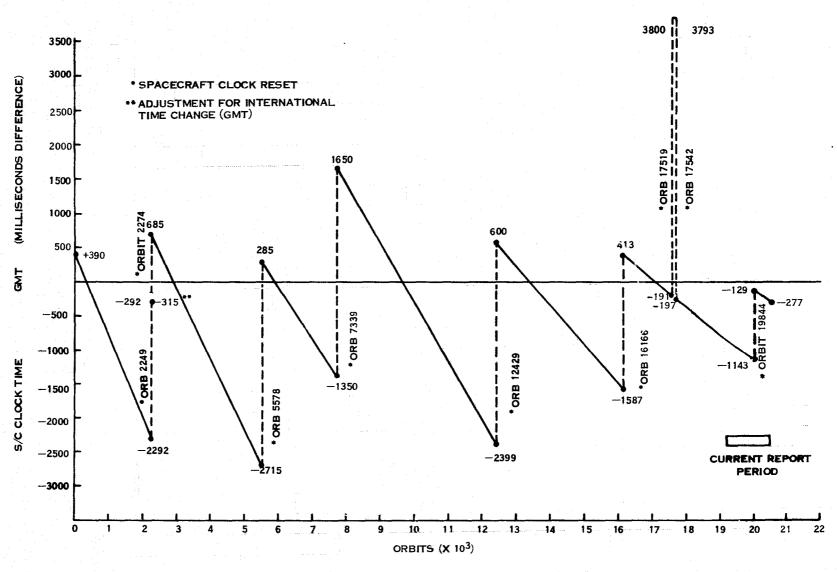


Figure 5-1. Landsat-1 Spacecraft Clock Drift History

FS-

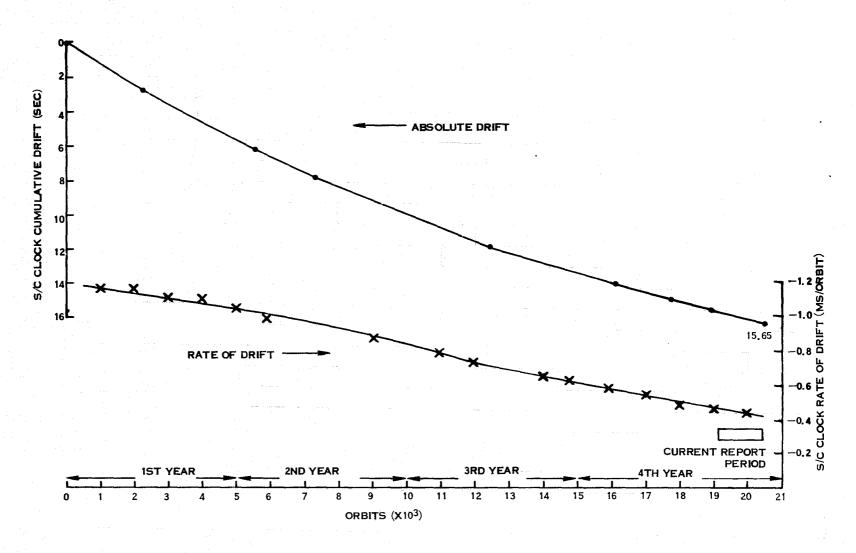


Figure 5-2. Landsat-1 Spacecraft Drift and Drift Rate

Table 5-1. Landsat-1 Command Clock Telemetry Summary

T				·				··· · · · · · · · · · · · · · · · · ·	rbit		
Function						10100	15000 1			10010	20001
No.	Name	Mode	Units	35	5099	10182	15233	1~924	19514	19946	20364
8005	Pri. Power Supply Temp		°C.	37, 31	39.37	39, 50	38.26	37.63	38.36	38.16	38.06
8006	Red. Power Supply Temp	- }	°C	35.73	38,08	38, 38	37.06	3 <b>6</b> , 99	37.58	37.42	37.33
8007	Pri. Osc. Temp	-	°C	31, 14	31.98	32, 11	31.14	31, 11	31.10	31.03	31.04
8008	Red, Osc. Temp	-	°C	30.47	31,39	31.42	30.48	30,48	30.47	30,20	30,18
8009	Pri. Osc. Output	-	TMV	0,95	0.96	0, 97	0.97	0,97	0.95	0.95	0.95
8010	Red, Osc. Output		TMV	**	**	**	**	**	**	**	**
8011	100 kHz	PriRed.	TMV	3,11	3.10	3, 11	3.12	3, 12	3.10	3,10	3, 11
8012	10 kHz	PriRed.	TMV	3, 10	3.07	3, 08	3.08	3.08	3.07	3.08	3.08
8013	2, 5 kHz	Pri, -Red,	TMV	2. 95	2, 95	2, 95	2.96	2,96	2.95	2.95	2. 95
8014	400 Hz	Pri, -Red,	TMV	4,40	4.40	4.40	4.40	4.40	4.40	4,40	4.40
8015	Pri. +4 V Power Supply	Pri. Clk ON	VDC	4.10	4.10	4.10	4.10	4.10	4.07	4.08	4.08
8016	Red, +4 V Power Supply	Red. Clk ON	VDC	3, 95	3, 95	3, 95	3.95	3, 94	3, 92	3.92	3.92
8017	Pri. +6 V Power Supply	Pri, Clk ON	VDC	6.06	6,07	6.07	6,11	6.10	6.06	6.06	6.06
8018	Red. +6 V Power Supply	Red, Clk ON	VDC	6.00	5.94	5, 94	5.97	5.96	5.93	5.93	5.93
8019	Pri6 V Power Supply	Pri. Clk ON	VDC	-6.02	-6.02	-6, 03	-6.04	-6.03	-6,02	-6.02	-6.02
8020	Red6 V Power Supply	Red. Clk ON	VDC	-5, 99	-6,00	-6.00	-6,01	-6,00	-5.99	-5.99	-5, 99
8021	Pri23 V Power Supply	Pri. Clk ON	VDC	-22.88	-22,89	-22, 89	-22, 95	-22,92	-22.88	-22.88	-22.88
8022	Red23 V Power Supply	Red. Clk ON	VDC	-22,98	-23,00	-23, 01	-23,06	-23.04	-22,99	-22,99	-22,99
8023	Pri29 V Power Supply	Pri. Clk ON	VDC	-29, 13	-29.16	-29, 15	-29,15	-29.13	-29.15	-29.15	-29.16
8024	Red29 V Power Supply	Red, Clk ON	VDC	-29.07	-29,21	-29, 21	-29.21	-29, 21	-29.21	-29, 21	-29, 21
8101	CIU A -12 V	CIA A ON	VDC	-12.33	-12,33	-12.34	-12.35	-12, 35	-12.34	-12,34	-12.34
8102	CIU B -12 V	CIU B ON	VDC	-12, 26	-12.26	-12, 23	-12.20	-12, 26	-12.24	-12,23	-12.24
8102	CIU A -5 V	CIU A ON	VDC	-5, 32	-5.34	-5, 34	-5.34	-5.34	-5.34	-5.34	-5.34
8104	CIU B -5 V	CIU B ON	VDC	-5, 31	-5, 31	-5.31	-5,31	-5.31	-5.31	-5,31	-5.31
		CIU A ON	°C	24,47	24,77	25.04	24.09	24,58	24.41	24.15	24.11
8105	CIU A Temp	CIU BON	°C	24, 96	25.31	25.45	24.48	24, 92	24.75	24.49	24.44
8106	CIU B Temp	CIU BON	oc	**	**	28, 67	27.53	27.14	27.09	26.85	26.88
8201	Receiver RF-A Temp	- :	oc oc		28, 22	**	**	**	**	17.39	17.47
8202	Receiver RF-B Temp	l -		27, 98			<b>!</b> ,	ŀ	36.57	36.34	36.40
8203	D MOD A Temp	Ī	°C	25,41	25,73	37.98	37.31	36,87	ŀ	1	
8204	D MOD B Temp	-	°C	35, 03	35,61	26, 12	25.27	24,89	24.35	24,04	24.10
8205	Receiver A AGC	Receiver A ON	DBM	**	**	-96.77	-85, 62	-89, 11	-94.50	-94.97	-95.73
8206	Receiver B AGC	Receiver B ON	DBM	-94,74	-84.67	**	**	**	**,	) ** 	**
8207	Amp. A Output	Receiver A ON	TMV	**	**	2.31	2.94	2,81	2.47	2.46	2.46
8208	Amp. B Output	Receiver B ON	TMV	2.81	3,22	**	**	**	**	**	**
8209	Freq. Shift Key A OUT	Receiver A	тму	**	**	1.10	1,11	1,10	1.10	1.10	1.10
8210	Freq. Shift Key B OUT	Receiver B ON	TMV	1.10	1, 11	**	**	**	**	**	**
8211	Amp. A Output	Receiver A	TMV	**	**	1,10	1.10	1,11	1.11	1,11	1.10
8212	Amp. B Output	Receiver B	TMV	1, 13	1,13	**	**	**	**	**	**
8215	D MOD A -15 V	Receiver A	TMV	**	**	5.00	5.00	5,00	4.99	4.99	4.99
8216	D MOD B -15 V	Receiver B	TMV	5,00	5,00	**	**	**	**	**	**
8217	Regulator A -10 V	Receiver A	TMV	**	**	5,40	5.39	5.39	5.38	5.38	5.38
8218	Regulator B -10 V	Receiver B	TMV	5, 50	5, 50	**	**.	**:	**	**	**

<sup>\*\*</sup>Units not in use

# TELEMETRY SUBSYSTEM (TLM)

The Telemetry Subsystem has performed nominally during the four years in orbit except for the failure of a four-function integrated circuit chip. Functions 1011, 6012, 7010 and 12238 remain inoperative. Table 6-1 shows typical telemetry values since launch.

Landsat-1 used memory section 0 0 until Orbit 12,565, after which it was reprogrammed (Memory Section 1 1) to be more compatible with Landsat-2 telemetry matrix. Memory section 1 1 continues to be used in the telemetry matrix.

Table 6-1. TLM Telemetry Summary

Function			Orbit							
No.	Function Name	Unit	35	5099	10592	15233	17824	19514	19946	20364
9001	Memory Sequencer A Converter	VDC	6,35	6,33	6.33	6.33	6,33	6.33	6, 33	6.33
9002	Memory Sequencer B Converter	VDC	**	+*	**	**	**	**	**	**
9003	Memory Sequencer Temp	°C	19,59	21,06	21,30	21.94	22,97	20.52	20.17	20.78
9004	Formatter A Converter	VDC	5, 99	5,99	5,99	5.99	6.02	5.99	5, 99	5, 99
9005	Formatter B Converter	VDC	**	**	**	**	**	**	**	**
9006	Dig. Mux A Converter	VDC	10.01	10.04	10,07	10.07	10.07	10.07	10.07	10.07
9007	Dig. Mux B Converter	VDC	**	**	**	**	**	**	**	**
9008	Formatter/Dig. Mux Temp	°C	22,50	24.89	25.00	23.55	32,03	25,00	24.99	25.00
9009	Analog Mux A Converter	VDC	26,01	21, 18	26,20	26.32	26,35	26, 35	26.35	26, 35
9010	Analog Mux B Converter	VDC	**	**	**	**	**	**	**	**
9011	Λ/D Converter A Voltage	VDC	10,00	10.07	10.07	10.07	10.07	10.07	10.06	10.07
9012	A/D Converter B Voltage	VDC	**	. **	**	**	**	**	**	**
9013	Analog Mux A/D Converter Temp	°C	25.00	26,83	27,49	25.63	29.10	25.32	25.00	26.56
9014	Preregulator A Voltage	VDC	19,93	19,95	19,94	19, 98	19,99	19, 90	19,90	19.90
9015	Preregulator B Voltage	VDC	**	**	**.	**	**	. **	**	**
9016	Reprogrammer Temp	°C	22.00	22,50	22.53	22.50	27.41	22,50	21.93	22.50
9017	Memory A Converter	VDC	6.00	5,99	6.00	5.97	6.00	5.97	5.97	5.97
9018	Memory A Temp	°c	17,51	17,50	17.50	17.50	17.59	17.39	17.10	17,47
9019	Memory B Converter	VDC	**	**	**	**	**	**	**	**
9020	Memory B Temp	°C	17.68	17.63	17.51	17.50	18,30	16.61	16.18	16.93
9100	Reflected Power (Xmtr A)	dBm	11,95	12.32	12,38	11.37	13.10	11.52	11.35	11.45
9101	Xmtr A -20 VDC	VDC	-19,75	-19.76	-19.75	-19,84	-19.82	-19.75	-19.75	-19.75
9102	Xmtr B -20 VDC	VDC	**	**	**	**	**	**	**	**
9103	Xmtr A Temp	°C	20.95	21, 14	22.01	21.98	31.92	22, 36	22.19	23.02
9104	Xmtr B Temp	°C	21.69	21.95	22.76	22.91	33,54	23.14	22.95	23, 92
9105	Xmtr A Power Output	dBm	25,12	25.35	25,24	25.00	25,00	24.69	24.61	24.57
9106	Xmtr B Power Output	dBm	. **	**	**	**	**	**	**	**

<sup>\*\*</sup> Units not used since prelaunch

## ORBIT ADJUST SUBSYSTEM (OAS)

The Orbit Adjust Subsystem has been fired thirteen times, seven times using the -X thruster and six times using the +X thruster. Three -X firings were for initial orbit correction and four -X for orbit maintenance. The six +X firings were for orbit maintenance.

Two orbit adjusts for orbit maintenance were performed during this quarter and the OAS functioned normally in both instances.

The burns occurred during Orbits 19747 (8 June 1976) and 19871 (17 June 1976). Each burn had a 2.4 second duration and each utilized the +X thruster.

Since the burn durations were short and freon is in limited supply, the orbit adjusts were performed with the ACS in the normal mode with penumatics disabled.

Spacecraft attitude remained stable during these maneuvers via flywheel response.

The subsystem pressure/temperature parameters continue to be normal. There are 64.83 pounds of hydrazine fuel remaining from an initial pre-launch load of 67.00 pounds. Figure 2-1 shows spacecraft ground track drift from standard orbit tracks and the effects of orbit adjustment. Table 7-1 is a summary of OAS performance to date, and Table 7-2 gives average telemetry values for the off quiescent state. The -Y thrust chamber of the OAS experienced increased temperatures during January and February of this year (see Orbit 17854 in Table 7-2), due to high sun angle and sun intensity. However, towards the end of this report period, the temperature has abated considerably with decreasing sun angle and sun intensity. All temperatures are in acceptable limits.

Table 7-1. Landsat-1 Orbit Adjust Summary

Orbit	Orbit Adjust No.	Ignition Epoch	Burn Duration (Seconds)	+ Δ a (Meters)	Engine Performance Efficiency	Fuei <sup>1</sup> Used (Lbs)	Tank Pressure (PSIA)	Tank Temperature ( <sup>O</sup> F)	Axis Thruster
38	1,	26 Jul 72 11:25:0.0	4,3	12	60 🕾		540	75	-X
44	2.	26 Jul 72 21:44:46	250.0	1975	103.4C	2.15	$v^2$	ບ <sup>2</sup>	~X
59	3.	27 Jul 72 23:34:45	318.0	2391	101,5%	)	516	73.9	-X
938	4.	29 Sep 72 00:30:00	12, 8	98	110.0 %	0.039	U <sup>2</sup>	u <sup>2</sup>	-х
2316	5,	13 Jan 73 00:21:30	20,4	154	106.0 %	0.071	489.4	75,4	-X
6390	6.	25 Oct 73 00:04:10.8	14,8	110	100.0 冗	0.048	486.8	73.9	-x
7826	7.	4 Feb 74 23:27:10,4	14.7	112	101.8 %	0.048	490.59	75,4	-x
11367	. 8.	16 Oct 74 22:42:10.8	8.0	<b>-</b> 65	106.0 %	0.026	490,59	74.0	+X ·
11464	9.	23 Oct 74 21:40:00.4	8.4	-66	102.0 %	0.027	490,58	73.9	+X
13611	10.	26 Mar 75 19:39:00.8	2.8	-22.6	101.8%:	0.01	490.09	72.5	<b>+</b> X
14365	11.	19 May 1975 21:19:00.8	1.6	-13	102.4 %	0.01	486.84	71.6	+X
19747	12	8 June 76 19:56:00,4	2.4	-19.3	102.10	10.0	490,59	70.1	+X
19871	13	17 June 76 17:22:00, 4	2.4	-19.8	105, S	0.01	486,84	<sup>2</sup> ~ −69.4	+X

Initial Fuel Capacity - 67 lbs. Unavailable

Table 7-2. Landsat-1 OAS Telemetry Values

Function						Orbit				
No.	Name	Units	35	5099	10182	15254	17854	19514	19946	20364
2001	Prop. Tank Temp.	°c	22.03	22.86	23.28	21.62	24. 07	21.20	20.78	21.20
2003	Thrust Chamber No. 1 (-x) Temp. **	°c	29.57	29.93	30.55	30.52	26, 52	29, 93	29.21	27.32
2004	Thrust Chamber No. 2 (+x) Temp. **	°C	38.76	40.28	38.91	36.25	35.93	35.70	36,08	35, 20
2005	Thrust Chamber No. 3 (-y) Temp. **	°c	34. 55	34. 41	36.09	38.45	57.50	41.65	40.99	43, 88
2006	Line Pressure	psia	539.29	486.87	490.61	486.87	494, 55	490.45	486.90	489,66

<sup>\*\*</sup> Wide spread of temperature is due to nozzle locations and satellite day/night transitions relative to data averaged. Typical orbital range is from 19 to 59 DGC.

# MAGNETIC MOMENT COMPENSATION ASSEMBLY (MMCA)

From launch through Orbit 20370 (23 July 1976) Landsat-1's MMCA has been energized eleven times in seven orbits, i.e., Orbits 73, 85, 110, 220, 11181, 11185\* and 11186\*. The MMCA was operated in the early orbits to reduce +Roll pneumatic gating. (\*Energized 3 times in one orbit)

In Orbits 11181 and 11186, it was energized in the plus and minus Yaw dipole configuration respectively in order to save freon gas by reducing the amplitude of the Pitch flywheel orbit frequency oscillation. In a short successful test during Orbit 11185 the plus Roll dipole was temporarily energized to determine if a positive roll dipole at the poles could unload the pitch flywheel. Upon test completion the Roll dipole was returned to 500 pole-cm.

No dipole adjustments were made during this report period.

The current dipole values are:

Pitch +2950 Pole-Cm

Roll -500 Pole-Cm

Yaw -3600 Pole-Cm

Telemetry Measurement shown in Table 8-1 shows that the dipoles are holding steady without drift.

Table 8-1. MMCA Telemetry Summary (Landsat-1)

			Orbits							
Number	Name	Units	35	5099	10182	15254	17854	19514	19946	20364
4001	A1 Board Temp	°C	19.77	19.03	19.11	17.59	17.59	16.80	16, 56	16.69
4002	A2 Board Temp	°C	23.58	23.05	23.13	21.83	21.79	21.18	21,02	21.05
4003	Hall Current	TMV	3.48	3.48	3.48	3.47	3.47	3.47	3.47	3.48
4004	Yaw Flux Density	TMV	3.11	3.11	3.15	4.02	4.03	4.03	4.03	4, 03
4005	Pitch Flux Density	TMV	3.13	2.51	2.52	2.52	2.52	2,52	2.52	2, 52
4006	Roll Flux Density	TMV	3.19	3.19	3.20	3.28	3.28	3, 28	3, 28	3.28

# UNIFIED S-BAND/PREMODULATION PROCESSOR (USB/PMP)

The USB subsystem performed all functions nominally during its four years in orbit. The only abnormality occurred in Transmitter A. After about two months in orbit, the transmitter output suddenly lost about 19% of its power. In a series of such power stepdowns over the next 7 months, the power output dropped to about 0.25 Watts, 16% of its original power. In the next 15 months, two years after launch, power dropped to 0.14 Watts where it was only marginally able to perform its functions. At that time, the redundant transmitter, B, was substituted. Full power of about 1.5 Watts was restored and it has remained at that level for the remaining two years.

Switching transmitters automatically switches receivers, so that all components of the subsystem have been used except the redundant portions (descriminator, and oscillator/Modulator) of the PMP Modulator.

Table 9-1 shows telemetry values since launch. All are nominal.

Figure 9-1 shows the USB power output history since launch. In Orbit 10068, the B Section of the transmitter was substituted, restoring full power output to the System. Figure 9-2 shows AGC readings at Goldstone for a constant reference orbit in each cycle since launch. The scatter of data points reflect variations in the ground station calibration and readout.

Table 9-1. Landsat-1 USB/PMP Telemetry Values

	Functions							Orbit		
No.	Name	Units	35	5099	10592	15233	17824	19514	19946	20364
11001	USB Revr AGC	DBM	-122.78	-131.99	-129.81	-105.41	-114.78	-129,19	-130.30	-132.00
11002	USB Xmtr Pwr	WTS	1.60	0.29	1.54	1.53	1.55	1.58	1.56	1.55
11003	USB Revr Error	KHZ	21.79	-21.32	-23.25	-18.01	- 17.52	-22.62	-22.16	-21.76
11004	USB Xpond Temp	DGC	22.92	22.64	25,64	25,11	32.19	25.16	24.88	25.37
11005	USB Xpond Press	PSI	15.91	15,91	15.92	15.94	16.34	15,90	15,89	15,90
11007	USB Xmtr A -15V	VDC	-15,20	-15.20	**	**	**	**	**	**
11008	USB Xmtr B -15V	VDC	**	**	-15.20	-14.96	-15.20	-15.04	-15.20	-15,20
11009	USB Range -15V	VDC	-14.76	-14.76	-14.58	-14.58	-14.58	-14.58	-14.58	-14.58
11101	PMP Pwr A Volt	VDC	-15, 12	-15.18	**	**	**	**	**	**
11102	PMP Pwr B Volt	VDC	**	**	-15.12	-14.82	-14.81	-15,11	-15.12	-15.13
11103	PMP Temp A	DGC	30.44	30.23	26.60	26.09	36.90	25.78	25.32	26.62
11104	PMP Temp B	DGC	**	**	31.64	31.67	42.29	30.37	30.01	31,12

<sup>\*\*</sup> Units Not in Use

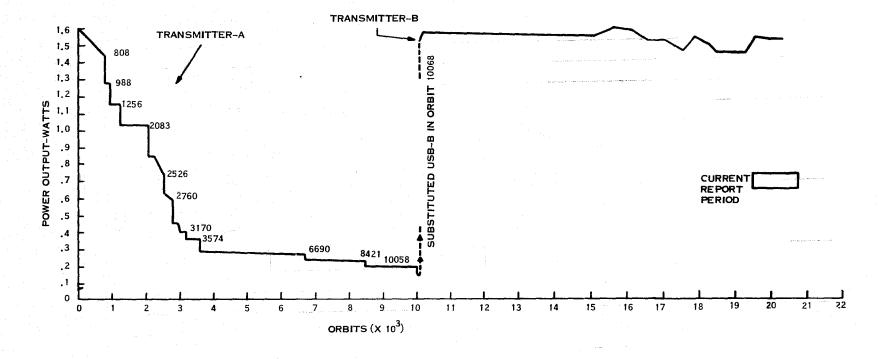


Figure 9-1. USB Power Output History (Landsat-1)

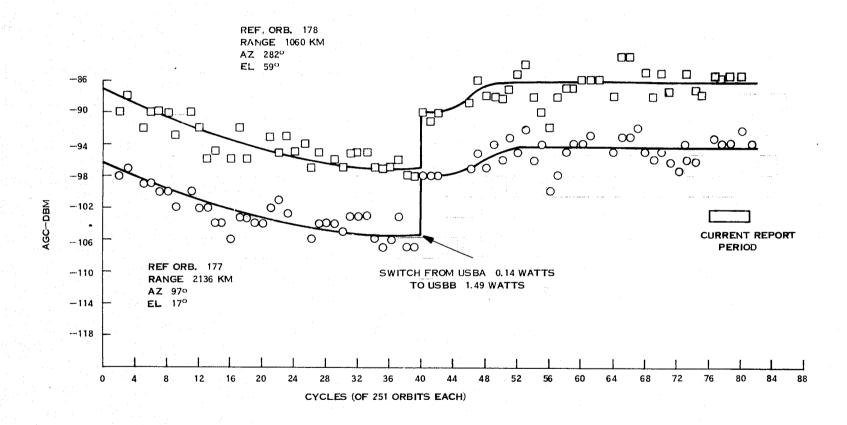


Figure 9-2. USB (Link 4) AGC Readings at Goldstone with 30' Antenna (Landsat-1)

-ST

# ELECTRICAL INTERFACE SUBSYSTEM (EIS)

Auxiliary Processing Unit (APU) consisting of Search Track Data, Time Code Data, and Backup Timers, operated satisfactorily throughout this report period. Telemetry for the APU is shown in Table 10-1. The APU is in Normal mode.

Table 10-1. Landsat-1 APU Telemetry Functions

				Orbit										
Functions	Description	Unit	7	5098	10182	15254	17854	19514	19946	20364				
13200	APU, -24.5 VDC	VDC	-24, 90	-24.90	-24.91	-24.90	-24.90	-24.90	-24.89	-24.90				
13201	APU, -12 Volts	VDC	-12.08	-12.08	-12.07	-12.06	-12,06	-12,05	-12.04	-12.05				
13202	APU Temp.	DGC	25.49	26.95	27.15	26.82	31.49	27.28	26,92	27.31				

The Power Switching Module (PSM), containing the switching relays for power to Orbit Adjust, MSS, WBVTR No. 1 and No. 2., RBV and PRM, functioned normally. The MSS power circuits have been operating on a regular basis throughout this report period. The power relay for the RBV remained in a failed closed condition since Orbit 196.

The Interface Switching Module (ISM) performed all switching normally during this report period.

The spacecraft regulators switching circuits were exercised when an unencoded command (stimulated by RF noise) caused the spacecraft regulator to switch from Space Regulator 2 to Spacecraft Regulator 1 in Orbit 20113 on 29 June 1976.

## THERMAL SUBSYSTEM (THM)

The Thermal Subsystem in Landsat-1 has completed four years of successful temperature control of all spacecraft equipment. The minor anomalies in the subsystem were mainly associated with telemetry and have not affected the spacecraft mission.

Since the time of launch, the right sun sensor on Landsat-1 has registered temperatures higher than expected. However, this has been determined to be justifiable for the particular location and bonding techniques used for the sensor. During Orbit 4396 (3 June 1973) telemetry function 7101 (THM TH07 STI) became disabled when four telemetry gates mounted on one integrated circuit chip failed.

During each year in the past, Landsat-1 has experienced a period of high temperatures brought about by a combination of adverse peaks of high sun intensity, sun angle and longer satellite days. The cyclically varying sun angle and length of satellite day reaches higher and higher peaks in successive years due to the drift in the satellite's orbital plane. Thus, during February 1976, Landsat-1 experienced the highest temperatures to date. The increase in temperature was must noticeable along bays 11 through 17, which are normally warmer than others. The temperature spread between batteries increased to more than 15°C with battery 5 in bay 14 registering temperatures as high as 34.7°C. Although the spacecraft mission was unaffected, the high temperature environment affected the response of the sensor potentiometer for shutter 14 position telemetry (FUNC 7072). However, the response became normal when the temperatures dropped to a lower range. During February 1977, the spacecraft will experience still higher sun angles and longer satellite days, resulting in even higher spacecraft temperatures.

Table 11-1 shows average analog telemetry values from data recorded on the NBR, for selected orbits since launch.

The compensation load configuration on Landsat-1 has been switched several times to get even temperatures among spacecraft components. A history of compensation load switching is given in Table 11-2.

During this report period the sun intensity ranged between 0.989 and 0.967 of the mean value and the space-craft temperatures remained in the normal range. (See Orbits 19514, 19946 and 20364 in Table 11-1.) The temperatures are expected to increase in the on-coming period of higher sun intensity. Figure 11-1 shows a typical thermal profile for average bay temperatures of the sensory ring at the end of this report period.

Table 11-1. Landsat-1 Thermal Subsystem Analog Telemetry (Average Value of Frames for Data Received in NBTR Playback)

		r	<del></del>	<del></del>		<del></del>			<del> </del>	
	Function					Orbits				
No.	Description	Unit	26	5098	10182	15254	17854	19514	19946	20364
7001	THM THO1 ST1	DGC	19.52	20.85	21.65	19.48	20.53	18.55	18,32	18.72
7002	THM TH02 SBO	DGC	18.60	19.95	20.60	18.62	18.52	17.90	17.78	17.87
7003	THM TH03 STI	DGC	18.48	20.16	20.87	18.11	18.30	17.16	16.96	17.20
7004	THM TH10 TCB	DGC	19.47	20.25	20.36	19.76	22.35	19.92	19.62	19.75
7005	THM TH04 STI	DGC	18.39	19.71	20.35	17.86	17.91	17.06	16.92	17.08
7006	THM TH05 SBO	DGC	17.57	18.39	18.81	17.20	16.78	16.49	16.34	16.47
7007	OA-X THRUSTER	DGC	21.95	22.95	22.90	22.25	21.98	21.92	21.65	21.33
7008	THM TH06 STO	DGC	15.95	16.61	16.90	15.34	14.92	14.56	14.41	14.52
7009	THM TH06 SBI	DGC	19.38	20.35	20.93	18.98	18.52	17.99	17.74	17.86
7010	THM TH07 STI	DGC	18.61	*	*	*	**	**	**	**
7011	THM TH08 STO	DGC	21.78	22.77	22.88	22.03	21.65	21.62	21.40	21.17
7012	THM TH09 SBI	DGC	21.81	22.87	23.08	22.20	22.97	21.98	21.71	21.66
7013	THM TH10 SBO	DGC	18.73	19.53	19.64	19.00	20.07	18.88	18.60	18.56
7014	THM TH11 STI	DGC	22.37	23.35	23.57	22.80	26.10	22.94	22.62	22.88
7015	THM TH12 SBO	DGC	22.37	23.17	23.03	22.86	28.89	23,52	23.17	23.71
7016	THM TH13 STI	DGC	20.95	22.02	22.47	22.00	28.77	22.47	22.10	22.89
7017	RBV BEAM CTR LN	DGC	21.53	22.62	22.84	21.88	23.87	21.83	21,53	21.63
7018	THM TH14 STO	DGC	20.38	21.40	21.93	21.83	30.96	22.36	22.04	23.19
7019	NBR RAD OUTBD B4	DGC	5.09	5.86	6.00	4.37	4.37	3.34	3.20	3,31
7020	THM TH15 SBI	DGC	21.14	23.24	23.99	22.18	29.63	22.36	21.97	23.06
7021	THM TH16 STI	DGC	20.73	22.90	23.68	21.64	26.82	21.17	20.77	21.68
7022	THM TH17 SBI	DGC	20.22	22.76	23.56	21.47	24.88	20.33	19.93	20.83
7023	THM TH18 SBO	DGC	21.90	24.29	25.19	23.47	25.44	22.12	21.85	22.56
7030	THM TH03 BUR	DGC	16.05	17.07	17.42	15.35	15.09	14.73	14.63	14.62
7031	THM TH06 BUR	DGC	13.59	14.17	14.28	12.87	12.40	12.18	12.01	12.07
7032	THM TH09 BUR	DGC	19.92	20.75	20.74	20.17	20.56	20.02	19.78	19.64
7033	THM TH12 BUR	DGC	21.51	22.16	22.76	22.65	29.42	23.40	23.05	23.67
7034	THM TH15 BUR	DGC	19.70	21.67	22.38	21.33	28.86	21.54	21.22	22.23
7035	THM TH18 BUR	DGC	20.11	21.36	22.02	20.54	22.17	19.83	19.66	20.07
7040	THM TH01 TCB	DGC	19.27	20.46	21.26	19.19	19.94	18.45	18.28	18.59
7041	THM TH02 TCB	DGC	17.99	19.23	19.89	17.80	17.70	17.10	16.95	17.11
7042	THM TH03 TCB	DGC	18.34	19.94	20.92	17.79	17.64	17.19	17.04	17.16
7043	THM TH04 TCB	DGC	18.95	19.94	20.26	18.60	18.44	18.04	17.91	18.00
7044	THM TH05 TCB	DGC	16.27	16.98	17.32	15.90	15.57	15,21	15.03	15.22
7045	THM TH07 TCB	DGC	18.41	19.21	19.45	18.25	18.01	17.69	17.46	17.46
7046	THM TH09 TCB	DGC	19.38	20.37	20.64	19.85	20.13	19.50	19.18	19.17
7048	THM TH11 TCB	DGC	21.98	22.94	23.18	22.80	26.85	23.19	22.86	23.18
7049	THM TH12 TCB	DGC	21.92	22.46	22.35	22.30	29.54	23.01	22.67	23,35
7050	THM TH13 TCB	DGC	21.21	21.99	22.29	22, 26	31.21	22.95	22.61	23.62
7051	THM TH14 TCB	DGC	21.38	22.88	23.62	22.74	31.57	23,02	22.55	23.83
7052	THM TH16 TCB	DGC	21.30	23.95	25.13	22.68	28.17	22.41	22.02	23.00
7053	THM TH17 TCB	DGC	21.73	24.03	25.02	23.33	25.17	21.44	21.14	21.89
7054	THM TH18 TCB	DGC	20.02	22.20	23.35	21.04	21.79	19.84	19.52	20.10
7060	THM SHUTTER BY 1	DEG	25.85	33.12	38.62	24.41	31.45	17.87	16.26	19.19
7061	THM SHUTTER BY 2	DEG	6.62	8.65	13.28	1.73	1.17	0.00	0.00	0,00
7062	THM SHUTTER BY 3	DEG	10,96	23,58	30.24	17,20	13.62	12.07	12 19	12.11

	******		
	7.3		
	$\sim$		
	·E		
	24		
	$\simeq$		
	$\circ$		
	-		
	۳,		
	-		
	-		
	إسهبو		
	=		
	h-		
	يستنو		
	~		
	-		
	RAME		
١		)	
	<b>!</b> ~	_	
	1		

1042.	TO SHARE HIDE THOSE	Dac	21.04	441-46	44.30	22.50	28.91	,720.01	22.67	20.00
7050	THM TH13 TCB	DGC	21.21	21.99	22.29	22.26	31.21	22,95	22.61	23.62
7051	THM TH14 TCB	DGC	21.38	22.88	23.62	22.74	31.57	23.02	22.55	23.83
7052	THM TH16 TCB	DGC	21.30	23.95	25.13	22.68	28.17	22.41	22.02	23.00
7053	THM TH17 TCB	DGC	21.73	24.03	25.02	23.33	25.17	21.44	21.14	21.89
7054	THM TH18 TCB	DGC	20.02	22,20	23.35	21.04	21.79	19.84	19.52	20.10
7060	THM SHUTTER BY 1	DEG	25,85	33.12	38.62	24.41	31.45	17.87	16.26	19.19
7061	THM SHUTTER BY 2	DEG	6.62	8.65	13.28	1.73	1.17	0.00	0.00	0.00
7062	THM SHUTTER BY 3	DEG	10.96	23.58	30.24	17.30	13.62	12.37	12.19	12.44
7063	THM SHUTTER BY 4	DEG	30.60	35.71	37.92	29.50	27.75	25.28	24.20	25.00
7064	THM SHUTTER BY 5	DEG	15.03	16.25	15.00	8.08	5.19	4.62	4.62	4.62
7065	THM SHUTTER BY 7	DEG	17.14	24.64	21.96	14.50	9.00	8.00	8.00	8.00
7067	THM SHUTTER BY 9	DEG	33.26	38.44	39.50	38.24	38.83	37.97	37.50	37.50
7068	THM SHUTTER BY 10	DEG	24.68	28.68	27.31	26.03	40.69	24.26	24.26	24.26
7069	THM SHUTTER BY 11	DEG	39.66	46.89	48.96	46.97	62.45	48.59	46.17	48,40
7070	THM SHUTTER BY 12	$\mathbf{DEG}$	43.81	46.63	45.68	45.95	70.31	50.46	48.21	52.19
7071	THM SHUTTER BY 13	DEG	40.39	46.38	44.79	42.84	62.63	43.37	42.46	44.43
7072	THM SHUTTER BY 14	DEG	34.20	39.70	41.91	34.28	58.50	33.91	33.07	34.65
7073	THM SHUTTER BY 15	DEG	45.40	58.74	64.79	55.15	82.15	59.27	55.76	63.60
7074	THM SHUTTER BY 16	DEG	24.50	48.46	53.54	38.76	64.40	36.46	33.28	40.06
7075	THM SHUTTER BY 17	DEG	39.06	<b>54.</b> 96	61.88	51.06	63.68	36.85	34.14	39.95
7076	THM SHUTTER BY 18	DEG	29.70	43.15	51.20	35.12	40.95	25.87	22.56	28.09
7080	THM Q1 T ZENER V	VDC	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19
7081	THM Q2 T ZENER V	VDC	8.40	8.40	8.40	8.40	8.40	8.40	8.40	8.40
7082	THM Q3 T ZENER V	VDC	8.31	8.31	8.32	8.31	8.31	8.31	8.31	8.31
7083	THM Q1 S ZENER V	VDC	8.31	8.32	8.35	8.31	8.35	8.31	8.31	8.31
7084	THM Q2 S ZENER V	VDC	8.19	8.19	8.20	8.19	8.20	8.19	8.19	8.19
7085	THM Q3 S ZENER V	VDC	8.15	8.15	8.15	8.15	8.15	8.15	8.15	8.15
7090	THM PSM MOUNT	DGC	21.60	22.54	22.98	21.43	24.02	20.95	20.61	20.98
7091	THM IND ATTITUDE	DGC	19.40	20.42	20.88	19.13	19.16	18.36	18.13	18.23
7092	THM RBV RADIATOR	DGC	15.65	17.22	17.47	16.55	18.68	16.72	16.43	16.52
7093	THM RBVC CTR BM	DGC	20.30	21.61	21.87	20.73	23.24	20.78	20.46	20.69
7094	THM WBVTR ROOT	DGC	12.96	15.71	16.07	13.77	14.42	11.80	11.65	12.00
7095	THM WBVTR RAD CT	DGC DGC	4.81	8.17	8.68	6.99	7.56	5.88	5.88	5.99
7096	THM WBVTR STRAP THM WB MT BAY 1	DGC	16.62 20.56	19.32 $19.52$	19.66 $21.37$	17.29 $16.97$	17.07	14.52	14.33	14.72
7097	THM WB MAT BAY 1	DGC	20.36	18.90	20.39	17.12	18.23	16.40	16.14	16.35
7098	THM WBVTR SEP 3	DGC	18.60	20.55	20.35	18.45	18.89	16.61	16.35	16.65
7099 7100	TEM WBVTR SEP 3	DGC	21.31	20.55	24.23	22.02	18.49 24.61	17.02	16.78	17.09
7100	THM WBVTR 1 CENT	DGC	21.31 $21.49$	23.72	24.23	21.63	24.61	20.55	20.19 $17.72$	20.96
7101	THM WBVTR 2 BAY	DGC	17.46	18.92	19.32	17.23	17.55	17.99		18.23
7102	THM WBVTR 2 BY 15	DGC	21.00	23.16	23.82	21.73	26.34	16.27 20.84	16.07 $20.47$	16.31 21.33
7104	THM WBVTR 2 CTR	DGC	19.35	21.51	21.81	19.54	20.59	17.30		
7104	THM NBTR B SEP 6	DGC	18.06	19.30	19.79	17.82	18.32	17.30 16.64	17.01 16.46	17.53 16.74
7105	THM NBTR B SEP 1	DGC	20.82	22.35	22.89	21.61	27.72	21.58		
7107	THM NBTR BM CTR	DGC	19.37	21.04	21.34	19.51	21.72		21.19	22.04
7107	THM MSS MOUNT 14	DGC	19.18	21.15	21.34 $21.70$	20.06	26.45	18.74	18.43	18.94
7108	THM OA -Y THRUSTER	DGC	22.21	23.80	24.69	24.40	34.20	20.15	19.79	20.70
7110	THM MSS WBVTR BM	DGC	18.14	20.06	20.53	18.18	19.56	25.23 17.18	24.82 $16.97$	26.22
7111	THM OA +X THRUSTER	DGC	20.30	19.92	21.22	18.07	19.48			17.38
7130	THM AUX P1 T	DGC	15.69	8, 49	-18.90	9.68	21.76	17.55	17.36	17.57
7131	THM AUX P2 T	DGC	10.63	1.59	.41	5.64	23.25	9.25 25.57	9.67	10.29
1101	11111110111111		10.00	1.00	•	0.02	20.20	25.57	16.82	25.81

<sup>\*</sup>Function 7010 became invalid after an integrated circuit chip failure in the TMP on Orbit 4396.

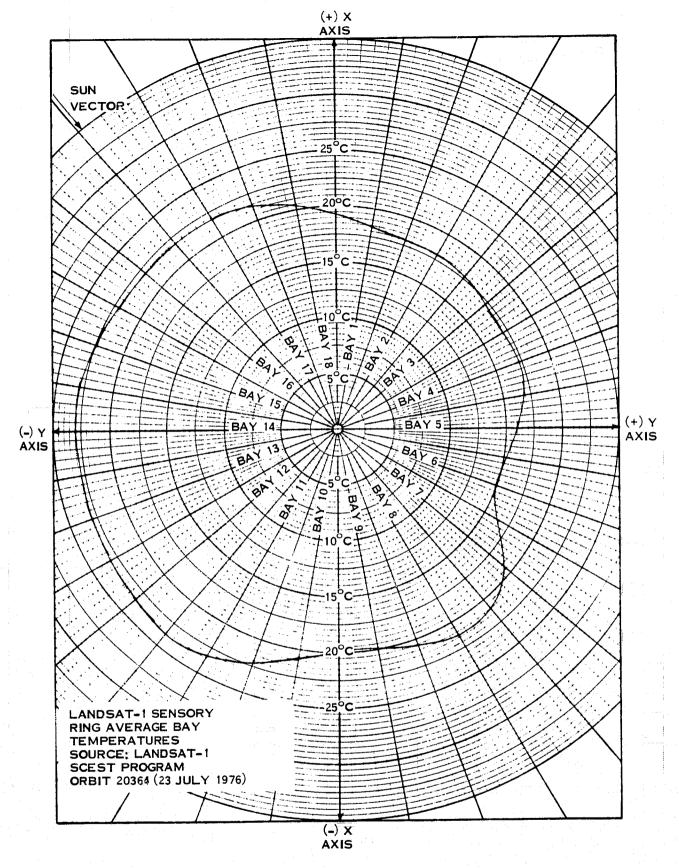


Figure 11-1. Sensor Ring Thermal Profile

Table 11-2. Landsat-1 Compensation Load History

ſ			C	mpensat	ion Load	Status '			
r	Orbits	I	2	3	-1		6	7	``
Ī	Launch	.0	0	0	0	0	0	()	0
١	2	0	0	Х	X	N.	0	N.	N.
l	6	Y. I.	X	X	×	N	n	N	X.
	118	0	0	0	ο	0	n	0	0
l	156	X	.x	X	××	X	0	٧.	N
l	194	0	0	0	- 0	0	0	0	0
	197	X	x	X	х	N	0	×	X
Ì	701	N	x	О	X	. ×	0	×	X.
	1410	X	х	0	X	x	0	0	N
Ì	3484	x	x	X	x	x	0	0	, S
	3641	Х	N <sub>i</sub>	0	х	х	. 0	0	, , S
l	3646	x	x	×	х	х	0.	0	x
	4177	X	X	0	x	X	0	n .	N.
١	6872	N	x	х	X	N.	0	0	N
1	6966	X	x	0	x	x	0	υ	X
1	8291	x	x	х	х	x	0	0	X
	8348	х	X	0	x	x	0	0 .	x
١	8449	х	x.	x	X	X	0	0	х
	8472	х	x	0	x	x	0	0	х
	8538	X	x	х	x	×	0	0	X
	8928	х	×	0	х	x	0	0	X
	9898	x	x	х	x	x	0	0	х
	10410	x	x	0	x	х	. 0	0	х
	11125	0	0	0	0	0	0	0	0
ı	11126	x	X	o	x	x	0	0	х
	11127	0	0	0	0	0	0	0	0
	11133	X	x	0	x	Х	0	0	N
	12604	x	x	х	x	х	0	. 0	X
	13206	X	x	0	×	x	0	0	0
	15584	x	X	0	0	X	0	О	0

<sup>\*</sup> Note: x = ON 0 = OFF

# NARROW BAND TAPE RECORDERS (NBR)

The NBR subsystem provided excellent service until Narrowband Recorder-B was turned off in Orbit 15256 when an apparent clutch failure resulted in tape stoppage. This was attributed to normal wear of component. With a design goal of one year, NBTR-B operated normally for three years, NBTR-B has remained inactive since then.

Narrowband Recorder-A operated satisfactorily during this period, and has provided coverage for MSS real-time operations as well as approximately 3-1/2 hours daily of normal orbital telemetry recording and play-back functions. Continuous NBR coverage is not being provided in order to conserve the remaining NBR life.

Table 12-1 gives cumulative operating hours for both recorders by modes, and Table 12-2 gives typical telemetry values.

Table 12-1. NBR Operating Hours by Modes, Landsat-1

NBR	ON	OFF	Playback	Record
A	15408	19700	618	14790
В	11909	12666	476	11433

Table 12-2. Narrowband Tape Recorder Telemetry Values, Landsat-1

	Function	Ту	pical Telemet	ry Values - O	rbits	<u>.</u>	
No.	Name	36/37	2111/2112	4980/4981	6751/6752	7211/7212	7631/7632
10001	A - Motor Cur. (ma)	1					
	Record	132.0	133.3	130.2	128.6	127.0	128.6
	P/B	108.0	95.2	93.7	92.1	88.9	90.5
10101	B - Motor Cur. (ma)						
	Record	148.5	141.7	135.7	128.1	128,1	129.6
	P/B	143.6	138.7	135.7	125.1	120.1	125,1
10002	A - Pwr Sup, Cur. (ma)		"				
	Record	170.5	167.5	162.5	155,9	156.0	155.9
	P/B	410.0	399.3	399.3	382.1	389,4	396.0
10102	B - Pwr Sup. Cur. (ma)	,		7.1			
	Record	260.0	261.3	264.5	261.3	261.3	261.4
	P/B	481.0	479.7	489.2	476.6	463.9	470.2
10003	A - Rec. Temp (DGC)	26.1	26.1	24.2	21.8	22.4	21.8
10103	B - Rec. Temp. (DGC)	27.0	27.0	26.2	22.7	24.3	25.4
10004	A - Supply (VDC)	-24.87	-25.1	-25,1	-24.8	-25.1	-25.1
10104	B - Supply (VDC)	-24.55	-24.6	-24.6	-24.6	-24.4	-24.4

## WIDEBAND TELEMETRY SUBSYSTEM (WBTS)

The Wideband Telemetry Subsystem has operated nominally throughout the four year period. WPA-1, normally used with RBV data, has been used only briefly because the failure of the RBV input power circuit prevented the use of that equipment after the second week in orbit. Between Orbits 1890 and 2099 WPA-1 was substituted for WPA-2 during the Apollo launch operations to transmit MSS data to avoid possible interference to the launch operation. WPA-2 and its modulator, with MSS input, have operated nominally throughout the 4-year period. Except for brief tests after launch in the 10-watt mode, both WPA's have operated in the 20-watt mode. The only subsystem component that has not been used in orbit is the redundant Modulator Power Supply (B).

Table 13-1 shows typical telemetry values. All are nominal.

Figure 13-1 is the AGC history at Goldstone. The scatter of data points reflect variations in the ground station calibration and readout. The interweaving of the data points of the two curves and the close proximity of the curves to each other is a reflection of the antenna design to deliver equal power to all ranges. The curves are separated less than 4 dB. Since one is at double the range of the other, power from an omni-directional antenna would generate curves separated by 6 dB. For comparison, the USB antenna delivers power at these ranges with a difference of 8 dB. (See Figure 9-2). It is evident, therefore, that the antenna design for the wideband power amplifier was largely successful in delivering increased power to increased ranges.

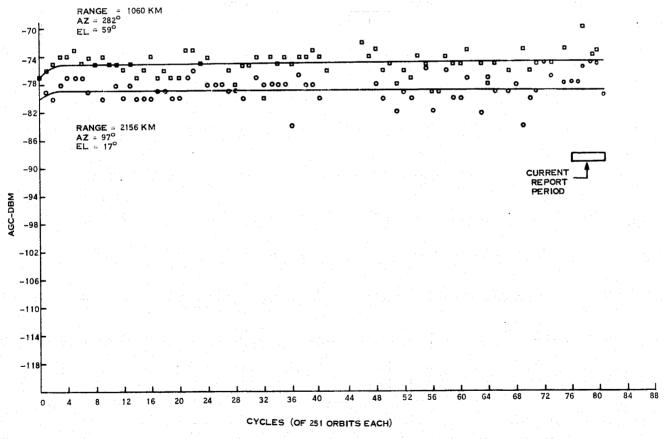


Figure 13-1. WPA-2 (Link 3) AGC Readings at Goldstone with 30' Antenna - Landsat-1

WBPA-1

	Function			0:	rbits	
Number	Name		26	1894	1944	2095
12001	Tmpt TWT Coll.	(DgC)	35.7	39.20	39.90	39.90
12002	Helix Current	(Ma)	6.08	6.49	6.58	6.78
12003	TWT Cath. Curr.	(Ma)	45.89	43.54	43.48	45.01
12004	Forward Pwr	(DBM)	43.18	42.88	42.61	43.15
12005	Reflected Pwr	(DBM)	34.95	34.99	34.80	35.21
12227	Loop Str. AFC Con Volt (1)	(MHz)	-0.39	-1.29	-0.86	-0.67
12229	Mod Temp VCO	(DgC)	21.93	20.31	20.88	20.39
12232	+15 VDC Pwr Sup A (2)	(TMV)	2.69	2.69	2.65	2.62
12234	-15 VDC Pwr Sup A	(TMV)	5.98	5.96	5.73	5.78
12235	+5 VDC Pwr Sup A	(TMV)	3.94	3.94	3.94	3.95
12238	-5 VDC Pwr Sup A	(TMV)	5.28	5.26	5.18	5.12
12240	-24 VDC Unreg Volt A	(TMV)	5.56	5.51	5.42	5.49
12242	Inv. Temp	(DgC)	20.60	23.43	24.71	24.04

WBPA-2

	Function					Orbits		,		•
Number	Name		33	4096	10602	15233	17824	19567	19957	20358
12101	Temp TWT Coll. (Max)	(DgC)	35.38	34.24	35.96	29.77	23, 88	29.62	29.17	33.90
12102	Helix Current	(Ma)	7.32	7.70	7.67	7.90	7.94	7.82	7.83	7.82
12103	TWT Cath. Cur.	(Ma)	44.30	43.85	42.72	43.70	42.65	42.91	42.91	42.83
12104	Forward Pwr	(DBM)	43.57	43.57	43.47	43.52	43.49	43.45	43.46	43.41
12105	Reflected Pwr	(DBM)	31.59	32.79	32.62	33.07	33,11	32.72	32.73	32,60
12228	Loop Str. AFC Con Volt (1)	(MHz)	1.11	-0.78	-1.12	-1.05	-1.17	-1.40	-1.46	-1, 53
12229	Mod Temp VCO	(DgC)	21.70	20.88	21.50	21.78	20,45	21.76	21.13	23,65
12232	+15 VDC Pwr Sup A (2)	(TMV)	2.68	2.69	2.69	2.65	2.67	2.67	2.66	2.66
12234	-15 VDC Pwr Sup A	(TMV)	5.90	5.98	5.92	5.81	5.80	5.88	5.87	5.85
12236	+5 VDC Pwr Sup A	(TMV)	3.97	4.01	4.01	3.97	3, 97	4.01	4.02	3, 96
12239	-5 VDC Pwr Sup A	(TMV)	5.24	telemetr	y point defe	ctive		1	1	1
12240	-24.5 VDC Unreg Volt A	(TMV)	5.43	5.52	5.46	5.44	5, 47	5, 42	5.45	5. 37
12242	Inv. Temp	(DgC)	23.03	22.96	23.86	23.66	23.44	22, 56	22.01	22.73

<sup>(1)</sup> Satisfactory if not -14.0 or +14.0. (2) B Power Supply not yet used in orbit

# ATTITUDE MEASUREMENT SYSTEM (AMS)

The AMS subsystem was launched in the OFF mode and energized in Orbit 6. Its performance since Orbit 6 has been without incident. Attitude measurements made with the AMS are in good agreement with ACS fine attitude error measurements.

Table 14-1 gives typical AMS telemetry values.

Table 14-1. Landsat-1 AMS Temperature Telemetry

į.		:				Ort	oits			
Function	Description	Units	35	5099	10182	15254	17826	19514	19946	20364
3004	Case-Temp 1	DGC	18.92	19.42	19.71	18.54	19.40	18.56	18.27	18.23
3005	Assembly-Temp 2	DGC	19.15	19.76	19.96	18.73	19.74	18.89	18.57	18.51

# WIDEBAND VIDEO TAPE RECORDERS (WBVTR)

WBVTR-2 has not been operated since its failure in Orbit 148.

WBVTR-1 was removed from operational service after Orbit 9881 because of high minor frame sync error counts. The recorder has remained inactive since suspension of engineering tests after Orbit 10861.

Pressure and temperature telemetry values for WBVTR-1 transport and electronics units are shown in Table 15-1.

Table 15-1. WBVTR-1 Telemetry Values

WB	VTR-1 Functions			Telem	etry Va	lues in (	Orbits		
Number	Name	15	5029	10088	15260	17810	19514	19946	20364
13022	Press. Trans. (PSI)	16.12	16.11	15.98	15.73	15.73	15.59	15.59	15.59
13023	Temp. Trans. (DgC)	19.50	21.84	20.81	18.55	19.50	16,99	16,70	17.19
13024	Temp. Elec. (DgC)	22.78	20.44	23.72	15.00	15.38	14.55	14.29	14,23

# RETURN BEAM VIDICON (RBV)

During Orbit 196 (August 6, 1972) when the RBV was turned ON for a real time pass, a short to ground occurred in the Power Switching Module (PSM) between the Payload Regulated Bus and ground. When the scheduled time for turn OFF arrived, the cameras failed to turn OFF by normal means. Auxiliary means were used to disconnect the RBV. The RBV subsystem has not been used since then. RBV performance was nominal while in use.

The RBV has not been reactivated since Orbit 196, but it is capable of operation through individual component power switching. An assessment of the RBV performance was given in ERTS-1 Flight Evaluation Report 23 July to 23 October, 1972.

## MULTISPECTRAL SCANNER SUBSYSTEM (MSS)

The Multispectral Scanner Subsystem has operated nominally throughout the entire four years in orbit. Images have been taken of 95% of the earth's land masses with less than 30% cloud cover. Bit errors have remained in the order of 1 part per million. About 2 billion square nautical miles of the earth's surface have been imaged (which averages about 17 repetitions of all earth land masses). Cycling of equipment components has reached very high numbers; e.g., the scan mirror has cycled about 122 million times without significant change in line length or position of mid scan pulse. With the exception of Sensor 13, sensor response has gradually deterioriated at the expected rate, still well within useful range. Sensor 13 saturates before the other sensors when the scene approaches bright white, but software compensation nearly obscures this. There have been no equipment malfunctions.

The redundant portions of the subsystem power supplies have not been used operationally.

Figure 17-1 shows the number of scenes imaged at each geographical location in the first 3 years of operation. Figure 17-2 shows the number of scenes imaged since the first 3 years. Figure 17-3 shows the scenes imaged in this quarter. In these maps, only those scenes received by U.S. ground stations are shown. Scenes transmitted to Canada, Brazil and Italy (41% of total) are not shown.

Table 17-1 shows typical telemetry values since launch. All telemetry values are nominal.

Table 17-2 shows the history of sensor response to a constant input radiance level. Each sensor is sampled at 5 radiance levels, and all show essentially the same trends. Only one of these levels (the second highest) is listed in Table 17-2. Sensor 5 has declined most (22%) since launch. This is twice the average sensor decline. Sensor 13 appears to be levelling off from its earlier rising trend. It is now only 13% above its launch level.

Line length history is also shown in Table 17-2, and appears to be recovering some of its lost length.

Sun Calibrations, performed every two weeks, continue to show nominal performance.

にかんじょう はんはく さんばらり くしゅう ひょく ひろうかん かん ゆっと きょう はっちょう はい	さいまん りょうしゅう はっかん しょうかん かんしょう にんさり さいかん ちゃん ちゃん ひゃん かいしょう しょうしょう しょうけん はんにゅうぎょう かいしょう しょうしゅう しゅうちゅう しゅうけい はいしゅう はいしょう とうしょう しょうしょう しょうしょく しょうしょく はんしゅうき しょうしょうしょう しょうしょく しょうしゅう しゅうしゅう しゅう
	And and Antonion a
VV VV 4 4 4 5 V VV F A 6 6 6 6 7 4 6 9 9 9 0 4 0 4 0 4 0 4 0 4 0 4 0 4 0 4 0	
TIN NON-VIENDEN SENSE CONTRACTOR SENSE SEN	SOUN AND TO LOGATORS OF AND TO
the remained the second cool of the country of the second	ALC AD A 12 A DOCTO ON A 12 A 1
TO THE STATE OF TH	NATIONAL AND
できょうしょう かんしょうしょう というしゅう とうしょく アントラン アンドラン	
TO BE THE DE DE STANDER OF THE PROPERTY OF THE PROPERTY OF THE DESCRIPTION OF THE PROPERTY OF	SUPERSTREET STORE AND
Compression of the compression o	はいかけん なん にかいな 同じ かん はん なん なん はん なん なん なん なん はん はん と
TO THE REPORT OF THE PROPERTY	なまった ちょうよう はんしょく とうしょう はいしょう メンタック・スタック・スタック・スタック・スタック・スタック・スタック・スタック・ス
Transmission of the contraction	となっていっぱっぱっぱっぱっぱっぱっぱっぱっぱっぱっぱっぱっぱっぱっぱっぱっぱっぱっ
THE ROLL OF THE PROPERTY OF TH	インゴン くみか ひに オスター・音できました みのみみ カット メンタ メラタ・ようさ スランシ まっか かがっ スティング アングラック フェング かっかい しょうしょう とうしょう しゅうしゅう しゅうしゅう しゅうしゅう しゅうしゅう しゅうしゅう しゅうしょう スラング・マック・スティング しゅうけい ファック・スター スタック・スタック しゅうしゅう しゅうしゅう しゅうしゅう しゅうしゅう しゅうしょう スタック しゅうしゅう しゅうしゅう しゅうしゅう しゅうしゅう しゅうしょう スタック しゅうしゅう しゅうしゅう しゅうしょう スタック・スタック しゅうしゅう しゅうしゅう しゅうしゅう しゅうしょう スタック・スタック しゅうしゅう しゅうしょう
THE TRANSMITTER OF THE STATE OF	
THE STATE OF THE S	The Section of Control of Section Sect
• ๚๛ฅഗ ฅ ๛ฺฅ ๚ ฅ๛ ๑ ๛ ฅ๛ ๑ ๛ ๖ ๛ ๒ ๛ ๖ ๛ ๖ ๛ ๛ ๛ ๛ ๛ ๛ ๛ ๛ ๛ ๛ ๛ ๛	TO SERVICE OF THE SER
และ - พุทธ - พาการ	
m to make mental a delicious te microsis mentalinim servici sulla discessión.	
######################################	Note that the second of the se
engline navime se seus s'nundra explix e no engra do en ra	できない はいい はいかい はいかい はいかい はいかい はいかい はいかい はいか
そのよう ちゃっと うっとう できます タイスケッタ りょく こ てっぽっと ちょう しゅう くっか しゅう	្នាក់ ប្រជាពល ប្រជ
กันการกรุงนองกรงกรการการกรรษฐการกรรม	។ គេបានបន្ទាប់បានជាតិបានបានបានបង្គ្រាយបានបានបានបានបានបានបានបានបានបានបានបានបានប
ちゅうき ちゅうしょうしょうしょう くくちゅう きゅう くっぱん しょうしょう こうしょう こうしょう くりゅう ストロー・ クまり ウェット・ロット ロック・ロット ロック・ロック ロック・ロック	サードを使っている。 ・あいましましょうからなっている。 ・あいましましょうからなっている。 ・あいましましょうないないないないないないないない。 ・まなましましょうないないないないないないないないない。
₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	
で、	
กเของ พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.พ.	PORT STATE OF THE PORT OF THE
AND STATE AND	ரு மன்ற வருக்க மற்ற வருக்க விருக்க வி
To a the section of t	► ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ←
→ N→ UPAPADE XN+N⊕+XD+DDUN	
N N N N N N N N N N N N N N N N N N N	ระ เกษา√รเกษ เก
n a condensity and a co	- N
- 4777 -	
- NUMAN-10000 00 00 00 00 00 00 00 00 00 00 00 0	<del>≒</del>
FOR MANAGE AND	
un minus en aleman en mile en anne mon en	
жыныныкычийне фефицианцыки мике мяки и и	
Mumbar sign sa sa ta ma da da ma da	
Number subund to	
- ALLE OR ALL ALL ALL ALL ALL ALL ALL ALL ALL AL	W N N N N N N N N N N N N N N N N N N N
A CONTRACTOR OF A CONTRACTOR O	W N N N N N N N N N N N N N N N N N N N
NOW INTO A PORT OF THE PROPERTY OF THE PROPERT	W C C C C C C C C C C C C C C C C C C C
With the standard of the stand	M C C C C C C C C C C C C C C C C C C C
	M C C C C C C C C C C C C C C C C C C C
	M C C C C C C C C C C C C C C C C C C C
	M C C C C C C C C C C C C C C C C C C C
	ON O
	PATA USED FROM CYCLE OF TAKES NERE OBTAINED FOR EACH FRAME.  ON THE TAKES OF THE TAKES NERE OBTAINED FOR EACH FRAME.  ON THE TAKES OF THE TAKES NERE OBTAINED FOR EACH FRAME.
	DATA USED FROM CYCLE OF THE STATE SERE GREATHED FOR LACH FRAMES OF THE STATE OF THE
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	AN ON THE TRANSPORT OF THE TRANSPORT OF THE STATE OF THE TRANSPORT OF THE
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	TO NO NO NOTICE OF THE PROPERTY OF THE PROPERT
	DATA USED FROM CYCLE V 10 SUL TARLS NERE OBTAINED FOR LACH FRAME.  NAME OF THE PERSON ON TO TARLS NERE OBTAINED FOR LACH FRAME.  NAME OF THE PERSON ON TO TARLS NERE OBTAINED FOR LACH FRAME.  NAME OF THE PERSON ON TO TARLS NERE OBTAINED FOR LACH FRAME.  NAME OF THE PERSON OF THE PER
	TO NOT THE TOTAL TIMES TO THE TOTAL THE TOTAL TOTAL THE
The property of the property o	
Manage and an analysis and an	## 10
Manual Manual Salan Manual Man	## TO NOTE TO
Manual Manual Salan Manual Man	## 10
Manual Manual Salan Manual Man	DATA USEU FRUN CYCLE U 10 OUT TAKES RENE USTAINED TOS LACH FRANKE  ON NO TO THE TOLLUNING HAD BOOKS HOW TAKE TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKE TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKE TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES RENE USTAINED TOS LACH FRANKE  ON NO TOLLUNING HAD BOOKS HOW TAKES HAD BOOKS HOW TO TOLLUNING HAD BOOKS HAD BOOKS HOW TO TOLLUNING HAD BOOKS HAD BOOKS HAD BOOKS HAD BOOKS HAD BOOKS HOW TO TOLLUNING HAD BOOKS HAD
	A A USE FRON CYCLE OF TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED TO THE TARES MERE SSTATED FOR LEFT TARES  ON A THE TOLL PIROTED T
	ON O
	ON O



Figure 17-1. Computer Map of MSS Scenes for First Three Years Operation-Landsat 1

LS-1

17 - 3/4

ŀ															-														
1		- 1		1								· ·			: :	;													
		Ì													-			11											
1												-	į	1	1 1 1	111		1111											
				Ì	•								i		<u>.</u>			-											
4.											•				F.J.		:	-								-			. 7
						:			,		í					! !						474 940 +×07	 		-	1 1 1		1 1	1510
		!							:				:	!				2		- 2 - 11 - 4	7 + 4 4 4 7 + 4 4 4 7 + 4 4 4	77777 77477 7747		117.1 27.23	17 W 27 7 7 1 2 2 4 7 7 7 2 2 4 7 7 7 2 2 4 7 7 7 2 2 2 4 7 7 7 2 2 2 2	77727 7727 7 277	2 7 4 2 7 W	10 0 0 0 1 10 0 0 0 1 10 0 0 0 1	717171
						į							1	ļ		1				* 11 11 12 - 11 12	**************************************	4421		******	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	7 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	F 7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	4,7,7,7
				=				1	:											מית מית בית ביי		* * * * * U		1513		10111111111111111111111111111111111111	111111	2 3 3 Y	11.
						*						!	!			!				# 2 × 0 × 0 × 0 × 0 × 0 × 0 × 0 × 0 × 0 ×	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	572455	550	77.20	78 9 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1212	7 7 X	k	ويو: د ويو: و ويو: و
:				-	-			:	:												2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	*	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		151514 15	141 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	υ	اد: د. د د. د
					,			İ			1			į	. •									7775		- 0 0 X 40	171613 171613 171613	0 0 0 0 0 0 0 0 0	11
					İ			!											1				ייני עיטיקעי עיטיקעי עיטיען ⊷	- N N N H - 1	# X Jim h		- 2 F B	2	
												-		-			:												
												***************************************		1		1	: 		1				!	-1					
												1		į															
				۱.,	1	البد	F				:		-				ļ., j		İ.	:			. !	÷				l.,.	
1		÷	ŀ	;						:								. '											
								!																					
- 1		í	1				!								. :				1										
		:	:					:																					
							1																		:			. !	
					- [		1.									-	!												
:		:											Da	7a_USEU	FROM CYCL	E n! t*	÷1•		. :		:	: •					ł !		
		1						1							. •	HOOST HOW H		4 1 2 1	116.		i		- *						
:				ł						1				TET 2. Cx	1 M A G	791 2195 *301 3** *01 301	-1:06 -1:06	10/6 5, 1.6	3 10 <sup>7</sup> 9 1. 4 1 L	63 , 694 , 6 B L E	90% 1	008				!	;	!	
			1					i			:	1	1076	1524	3236	783	64	63 Fo7	651	730	1481	7 <sub>01</sub>							
				1											!			1.	1			i	1		1				
										1							- E		1				1			1		ĺ	
-																		1					1		i	1		į	
		1.												-															
				1	-														-			1	!						
												, i	1						- Annual Control										
											-		1 .																
-												- 1						į											
ŧ	1	1					1			:	000000 0000ww			-	1	. [					į	į.	1		1	1	1	1	

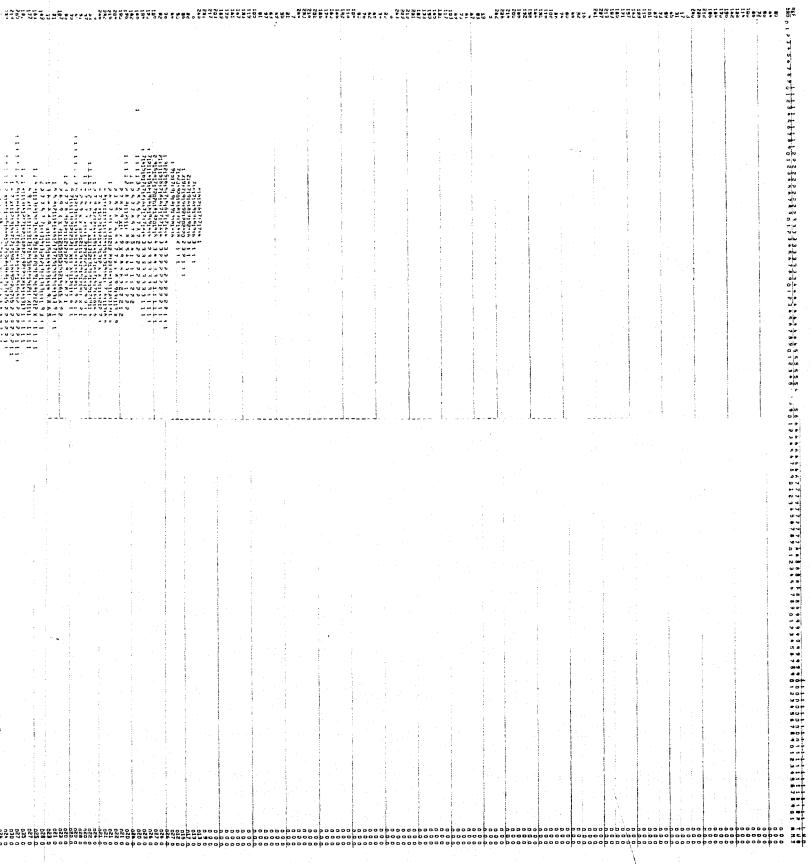


Figure 17-2. MSS Scenes Imaged in Fourth Year

LS-1

17-5/6

	ا حدود من من من الله الله الله الله الله الله الله الل	•		·.		:				<b>Γ</b> υ μ-		# # #
				· ·		. ,	ي پ ني	W W	መ ተመጉ	# CO CO CO CO CO CO CO CO CO CO CO CO CO C	1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	11 11 11 11 11 11 11 11 11 11 11 11 11
<b>!</b>						1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11111111111111111111111111111111111111	323322 1111 111111111111111111111111111	1111133 323233 444448 468888 44458691	000 000 000 000 000 000 000 000	######################################	reune
										00 00 00 00 00 00 00 00 00 00 00 00 00	44444 44466232444 6004444	
T												
									1			
	t 4 1										ente approvia de la companya ente	
DATA	USED FROM C	YCLE 76	TU 61.	(jš keDe	i BBTATN=C F	l OR FÄCH	FRAMF.					
145	I DELOGINO HA	IMAG	i E A C	UIS	I T T B N	d ·						
	THTAL:	182226 100+30% A G F R Y		2.10% 1	456 345 •90% 1-9 • A I L A	0X1						
688D	0% 10	% 20%	36% 40% 266 210	50%	60% 70% 158 167	80%	96% 100% 465 147					
								The state of the s			To comment of the com	
									-			
					- V							1

20466661 11495564 149556411 1154656666 246564654 1111111111111111111111111111111
26466641 15+45564 16+4566611 15+4566611 15+4566611 15+4566661 16+556566 16+556566 16+556666 16+5666666 16+5666666 16+566666 16+5666666 16+5666666 16+5666666 16+5666666 16+5666666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666 16+56666
26466661 15445554 14545554 11544456661 24545555 2444445222222211 13444434111111111 146555554522222211 146555554522222211 146555554522222211 146555554522222211 146555554522222211 1465555545111111111 15665666651111111111 1111111 11111111 11111111
25466661 15455554 145455554 145455555 1454555555 145655555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 1456555555 145655555 145655555 145655555 145655555 145655555 145655555 145655555 145655555 145655555 145655555 145655555 145655555 145655555 14565555 14565555 14565555 14565555 14565555 14565555 1456555 14565555 1456555 1456555 1456555 1456555 1456555 1456555 1456555 1456555 1456555 145655 1456555 1456555 1456555 1456555 1456555 145655 1
254666
A STATE OF THE PARTY OF THE PAR

			1
		the state of the s	
	· · · · · · · · · · · · · · · · · · ·		
		The second secon	
The second secon			
State and state			
		-	
the control of the co			
: :			
		The same of the sa	
American de la companya de la composiçõe de la companya de la comp		the state of the s	

Figure 17-3. MSS Scenes Imaged This Quarter

Table 17-1. MSS Telemetry Values

15046 1 15048 8 15050 8 15052 1 15043 1 15045 1 15047 1 15049 8 15051 8 15040 1	ELEC CVR T SCAN MIR REG T SCAN MIR DR. COIL T ROT SHUT HSG T FOPT 1 T MUX PWR CASE T PWR SUP T SCAN MIR DR. ELC T	(DGC) (DGC) (DGC) (DGC) (DGC) (DGC) (DGC)	17.46 19.37 16.35 15.94 16.91 17.67 21.19	5060 19.84 21.83 19.77 19.30 20.07	10587 19.75 21.96 20.48 19.78 20.23	15233 18.15 20.20 20.94 19.21	20.14 21.49 23.63 22.64	19567 18.41 20.31 21.35 19.82	19957 17.81 19.74 20.76 19.11	20358 18.07 20.11 21.90
15046 1 15048 8 15050 8 15052 1 15043 1 15045 1 15047 1 15049 8 15051 8 15040 1	ELEC CVR T SCAN MIR REG T SCAN MIR DR. COIL T ROT SHUT HSG T FOPT 1 T MUX PWR CASE T PWR SUP T SCAN MIR DR. ELC T	(DGC) (DGC) (DGC) (DGC) (DGC) (DGC)	19.37 16.35 15.94 16.91 17.67	21.83 19.77 19.30 20.07	21.96 20.48 19.78	20.20 20.94 19.21	21.49 23.63	20.31 21.35	19.74 20.76	20.11 21.90
15048	SCAN MIR REG T SCAN MIR DR, COIL T ROT SHUT HSG T FOPT 1 T MUX PWR CASE T PWR SUP T SCAN MIR DR, ELC T	(DGC) (DGC) (DGC) (DGC) (DGC)	16.35 15.94 16.91 17.67	19.77 19.30 20.07	20.48 19.78	20.94 19.21	23.63	21.35	20.76	21,90
15050 S 15052 I 15043 I 15045 I 15047 I 15049 S 15051 S 15040 I	SCAN MIR DR. COIL T ROT SHUT HSG T FOPT 1 T MUX PWR CASE T PWR SUP T SCAN MIR DR. ELC T	(DGC) (DGC) (DGC)	15.94 16.91 17.67	19.30 20.07	19.78	19.21				
15052 1 15043 1 15045 1 15047 1 15049 5 15051 5 15040 1	ROT SHUT HSG T FOPT 1 T MUX PWR CASE T PWR SUP T SCAN MIR DR. ELC T	(DGC) (DGC) (DGC)	16.91 17.67	20.07	- '		22.64	19.82	10 11	
15043 1 15045 1 15047 1 15049 8 15051 8 15040 1	FOPT 1 T  MUX PWR CASE T  PWR SUP T  SCAN MIR DR. ELC T	(DGC)	17.67	l l	20,23				70.77	19.96
15045 I 15047 I 15049 S 15051 S 15040 I	MUX PWR CASE T PWR SUP T SCAN MIR DR. ELC T	(DGC)		20.01		18.74	20.52	19.09	18.52	18,78
15047 15049 8 15051 8 15040 1	PWR SUP T SCAN MIR DR. ELC T	•	21 19	20.01	19.93	18.35	20.33	18, 59	18,02	18.28
15049 S 15051 S 15040 I	SCAN MIR DR. ELC T	(DGC)		22.03	23.87	26.92	30.84	26.47	26, 27	28,63
15051 S			17.41	20.00	20.21	19.83	21.88	20.23	19, 62	20.28
15040	SCAN MID USC T	(DGC)	16.12	19.41	20.23	21.16	23.83	21.70	21.09	22,41
	SCAN MIR HSG T	(DGC)	15.60	19.05	19.49	18.40	22.00	19.06	18.29	19.04
15042	MUX -6 VDC	(TMV)	4.03	4.03	3.98	4.02	4.07	4.03	4.03	4.03
	AVE DENS DATA	(TMV)	1.67	2.13	2.05	2.28	2.08	2,28	2,28	2,28
15054	CAL LAMP CUR A	(TMV)	1.12	1.12	1.12	1,12	1.12	1,12	1, 12	1.12
15056	BAND 2 <u>+</u> 15 VDC	(TMV)	5.10	5.10	5.04	5.10	5.10	5,10	5, 10	5,10
15058	BAND 4 <u>+</u> 15 VDC	(TMV)	5,10	5.10	5.04	5.10	5.10	5.10	5.10	5.10
15060	+ 12 -6 VDC REG	(TMV)	4.82	5.02	4.97	5,02	5.02	5.00	5,00	5.02
15062	+ 19 VDC REC OUT	(TMV)	4.80	4.90	4.97	5.03	5.03	5.03	5, 03	5,03
15064	BAND 1 HV A	(TMV)	5,10	5.16	5.12	5.12	5.13	5. 12	5, 12	5, 12
15066	BAND 2 HV A	(TMV)	4.50	4.52	4.52	4,50	4.52	4.50	4.50	4,50
15068	BAND 3 HV A	(TMV)	4.60	4.62	4.62	4.62	4.62	4.62	4.62	4,62
15070	SHUT MOT CON OUT	(TMV)	2.43	2.44	2.47	2,51	2.50	2.50	2.50	2,50
15041	S/D CONV REF V	(TMV)	5.93	5.93	5.87	5.93	5,93	5.93	5, 92	5.92
15053	SCAN MIR REG V	(TMV)	4,42	4.51	4.51	4.61	4.60	4.61	4.61	4.61
15055	BAND 1 <u>+</u> 15 V	(TMV)	4.97	4.97	4.92	4.97	4.97	4.97	4, 97	4.97
15057	BAND 3 ± 15 V	(TMV)	5,00	5.00	4.94	5.00	5.00	5.00	5,00	5,00
15059	-15 VDC TEL.	(TMV)	5.02	5.02	5,02	5.02	5.02	5.02	5, 02	5,02
15061	± 5 VDC LOGIC REG	(TMV)	4.82	4.81	4.77	4.76	4.77	4.78	4.78	4.78
15063	-19 VDC REG OUT	(TMV)	3,43	3,39	3,50	3.58	3.57	3.57	3, 57	3,57
15071	SCAN MIR DR. CLK	(TMV)	1.93	1.97	1.98	2.00	1.97	1.98	1.98	1,96

Table 17-2. MSS Response History Landsat-1 Quantum Level for Selected Work (0=Black: 63=White)

					Quantum	Level		j	
ſ		<b>~</b>	——-1st	Year <b>—</b> →	<b>←</b> 2nd Yr <b>;→</b>	<b>←</b> 3rd Yr.		Yr. —	% Change
	Band	Sensor	Launch	2-4 Quar.	5-8 Quar.	9-12 Quar.	13-15 Quar.	This Quar.	Since Launch
I		1	43	39	39	38	37	37	- 14
١		2	44	39	40	40	39	38	-14
		3	43	38	40	40	39	39	- 9
I	1	4	43	38	39	39	38	37	-14
ı		5	41	36	35	34	32	32	-22
١		6	43	39	41	41	40	39	- 9
١		7	47	43	43	42	41	41	-13
1		8	46	41.5	41	41	40	39	-15
		9	47	44	42.5	42	41	40	-15
	2	10	46	42	41.5	41	41	40	-13
١		11	47	42.5	42	42	41	40	-15
1		12	45	42	42.5	42	42	41	- 9
١		13	46	46	49	51	52	52	+13
1	:	14	44	42	42	42	42	42	- 5
		15	45	42.5	42	41	41	40	-11
ı	3	16	40	37.5	37.5	37	37	37	- 8
I		17	42	- 39	40	40	40	40	- 5
ı		18	44	40	40.5	41	41	40	9
		19	28	28	27	25	23	23	-18
١		20	25	26	25	23	21	20	-20
		21	26	27	26.5	25	23	23	-12
	4	22	23	23	22	-21	19	19	-17
		23	22	22.5	23	21	21	21	- 5
		24	24	23.5	24	23	22	22	- 8
		Line Length	3221	3219	3217	3216	3215	3217	- 0.12

# DATA COLLECTION SUBSYSTEM (DCS)

The Data Collection Subsystem was turned OFF after Orbit 12690 on 19 January 1975, and has not been used in the last 18 months.

The DCS operated without anomaly throughout the 3-1/2 years of its operation. Only Receiver No. 1 was used. The DCS operated with ground DCP's out to 3500 Km range - its horizon - with a reception probability of about 99%. There has been no evidence of adjacent DCP interference, or grazing angle effects. Periods of interference have been traced to identifiable external ground signals and successfully eliminated.

# Landsat-1 Anomalies and Observations

Date	Anomaly/Observation	How Observed	Comments
7/24/72	Sun Sensor Temperature High	Off-Line	No Action Required for ERTS-1; ERTS-B Redesigned
/24/72	Solar Paddle Temperature Excursions Greater Than Expected	Off-Line	No Action Required for ERTS-1; Math Model Corrected
/25/72	USB Power Output Decreasing	Off-Line	Switched to Side B in Orbit 10068 on 7/15/74 after decline to 0.14 watts. USB Side B stable and holding at 1.5 watts
3/03/72	WBVTR No. 2 Power Converter Shorted	Real Time & Off-Line	Turned All P/L Off During Pass. Formed NASA/GE/RCA Evaluation Committee. Disconnected since Anomaly.
			Redesigned for ERTS-B
/03/72	Decrease in Solar Array Current	Off-Line	Evaluate Degradation Effect Due to Solar Flare Activity
06/72	RBV Power Transient PSM Turn-Off Failure	Real Time	NASA/GE/RCA Evaluation Committee Formed; RBV off since Anomaly; Redesigned PSM for ERTS-B
/10/72	DCS Reject Messages Rose to Over 40% of Total Messages for 15 Days	Off-Line	External Interference; Located Source; No Serious Interference Since
3/10/72	MSS Cal Wedge Levels Decreasing	Off-Line	Leveled Off After Orbit 1000; At Or About 5% Below Earlier Values
3/03/72	Incorrect Time Tags in Comstor "B" Cell 12	Real Time	Reload Comstors and Verify; (Discontinued Active Use of Cell 12)
12/04/72 12/06/72	Pitch Motor Drive Duty Cycles Roll Increased for Short	Off-Line	Evaluate - Prepared Contingency Plan
	Yaw Period		
3/29/73	WBVTR No. 1; High BER	Real Time	Formed NASA/GE/RCA Committee; Lapped Heads; Now in Operational Use. Temporarily Restricted to Last 600 Feet (600 Seconds) of Tape
/08/72	Slow Leak in Forward IR Scanner Pressure	Off-Line	Not Expected to Interfere with Normal Operations
/20/72	Defect in Signal of Left Cosine Pot at S/C Midnight	Off-Line	Not Expected to Interfere with Normal Operations
3/03/73	Failure of Integrated Circuit Chip and TLM of Functions 6012, 1011, 12238 and 7010	Real Time & Off-Line	TLM Failure only. S/C Operations Normal
1/5/73	WBVTR-1 Tape Unit Pressure Drop	Real Time	Defect in Pressure Instrumentation which Causes Occasional
-, 0, 10	220 2 augus sinas 2 1000uto 210p	2001 21111C	Rapid Pressure Drop in TLM - Returns to Normal
1/13/73	Solar Array Drive	Real Time	Slight Peaks on Drive Voltage Ripple which Picked up Limit Flag - Returned to Normal
1/28/73	High Head Wheel Current, WBVTR-1, During Rewind	Real Time	Resumed Operations After Investigation WBVTR-1 Performed in a Nominal Manner
2/20/73	Pitch Motor Driver Duty Cycle Increased	Real Time	Similar to Entry 12/4/72 except more Sustained
2/22/73	RMP-1 and RMP-2 Showed Excessive Noise/Output	Real Time	Condition Lasted for Several Orbits and Returned to Normal
/20/74	Pitch Wheel Stopped During Sun Transient	Off-Line	During a sun transient in Orbit 8040 the pitch flywheel was changing directions. As it passed thru zero speed, the pitch
	en de la companya de la companya de la companya de la companya de la companya de la companya de la companya de La companya de la companya de la companya de la companya de la companya de la companya de la companya de la co		flywheel stopped and did not resume operation until 2 minutes had elapsed in spite of application of 100% clockwise pitch motor driver duty cycle during that interval
/5/74	WBVTR No. 1 High BER High HW-1	Real Time & Off Line	Limited Usage of Tape Footage
/7/74	WBVTR-1 High HW-1	Real Time & Off Line	Suspended Operation Pending Study

ないしている	Ž	
È	Z	
č	1	
	2	
7	Ź	
	> 	•
į	\	į

		OIL TAIN	changing directions. As it passed thru zero speed, the pitch flywheel stopped and did not resume operation until 2 minutes had elapsed in spite of application of 100% clockwise pitch motor driver duty cycle during that interval
3/5/74	WBVTR No. 1 High BER High HW-1	Real Time & Off Line	Limited Usage of Tape Footage
3/7/74	WBVTR-1 High HW-1	Real Time & Off Line	Suspended Operation Pending Study
3/21/74	WBVTR-1 High HW-1	Real Time & Off Line	Suspended Operation Pending Study
3/27/74	WBVTR-1 MSFE Count High	Off-Line	Suspended Operation Pending Study
4/02/74	WBVTR-1 MFSE Count High	Off-Line	Suspended Operation Pending Study
5/21/74	Pitch CCW Motor Driver Duty Cycle Increased	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
7/02/74	Pitch CCW Motor Driver Duty Cycle Increased	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
7/02/74	WBVTR-1 High HW-1 and MFSE	Real Time & Off Line	Suspended operation pending study
8/06/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
8/21/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/74 entry. Returned to Normal
8/28/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/74 entry. Returned to Normal
9/04/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Return d to Normal
9/09/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
9/14/74	PSM Power Regulator Switchover from 1 to 2	Real Time	VHF interference signal present. Occurred at 02:46:21. Spacecraft was normal
9/23/74	PSM Power Regulator Switchover from 2 to 1	Real Time	VHF interference signal present. Occurred at 01:49:17. Spacecraft is normal
9/25/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal
9/29/74	Pitch Flywheel Stopped	Real Time	The pitch CCW motor driver duty cycle begain increasing in Orbit 11120. The pitch flywheel stopped (from 400 RPM) following a sun transient in Orbit 11125. After a period of approximately 8 hours, and attitude disturbances, the pitch flywheel restarted. Earth acquisition was obtained and operations returned to normal in Orbit 11133.
10/09/74	RMP B Motor Current Variations	Off-Line & Real Time	As a precautionary measure a switch was made to RMP A in Orbit 11257. RMP B is still functioning and can be used in the event of RMP A failure
1/30/75	Solar Array Current Notch	On-Line	Solar array current drops $500-600$ ma for 1 to 14 minutes early in the day then return to normal. Solar panel temperature range at notch is $-20$ to $+20$ °C. No effect on S/C Mission
1/30/75	Narrow Band Recorder 2 Bit Error Rise	Real Time & Off-Line	Bit Errors began build up in Orbit 12837 and unit was turned off in Orbit 13015 on 2/12/75. Limited operation was resumed in Orbit 14116 and continued until failure to move tape in Orbit 15253
3/07/75	Batte y 6 Turned Off	Real Time & Off-Line	Battery 6 decrease in load share and rose slightly in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit 13346. Battery was allowed to discharge to -26.5 volts when it was turned on

was allowed to discharge to -26.5 volts when it was turned on

SI

E

~g.*=		Off-Line	Returned to Normal				
9/14/74	PSM Power Regulator Switchover from 1 to 2	Real Time	VHF interference signal present. Occurred at 02:46:21.  Spacecraft was normal				
9/23/74	PSM Power Regulator Switchover from 2 to 1	Real Time	VHF interference signal present. Occurred at 01:49:17.  Spacecraft is normal				
9/25/74	Pitch CCW Motor Driver Duty Cycle Increase	Real Time & Off-Line	Similar to 12/4/72 entry. Returned to Normal				
9/29/74	Pitch Faywheel Stoppes	Real Time	The pitch CCW motor driver duty cycle begain increasing in Orbit 11120. The pitch flywheel stopped (from 400 RPM) following a sun transient in Orbit 11125. After a period of approximately 8 hours, and attitude disturbances, the pitch flywheel restarted. Earth acquisition was obtained and operations returned to normal in Orbit 11133.				
10/09/74	RMP B Motor Current Variations	Off-Line & Real Time	As a precautionary measure a switch was made to RMP A in Orbit 11257. RMP B is still functioning and can be used in the event of RMP A failure				
1/30/75	Solar Array Current Notch	On-Line	Solar array current drops 500-600 ma for 1 to 14 minutes early in the day then return to normal. Solar panel temperature range at notch is -20 to +20 °C. No effect on S/C Mission				
1/30/75	Narrow Band Recorder 2 Bit Error Rise	Real Time & Off-Line	Bit Errors began build up in Orbit 12837 and unit was turned off in Orbit 13015 on 2/12/75. Limited operation was resumed in Orbit 14116 and continued until failure to move tape in Orbit 15253				
3/07/75	Battery 6 Turned Off	Real Time & Off-Line	Battery 6 decrease in load share and rose slightly in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit 13346. Battery was allowed to discharge to -28.5 volts when it was turned on in Orbit 14100. Normal operation resumed				
6/18/75	Battery 6 Turned Off	Real Time & Off-Line	Battery 6 decreased in load share and rose in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit 14780. Battery was allowed to discharge to ~26.5 volts when it was turned on in Orbit 15467. Normal battery operation resumed.				
7/18/75	Pitch Motor Driver Duty Cycle Increase and Pitch Flywheel Stopped	Real Time & Off-Line	The pitch flywheel motor driver duty cycle was high from Orbit 15191 to 15393 when it returned to normal. The pitch flywheel stopped for duration up to 202 minutes between Orbits 15303 to 15324.				
8/6/75	High Current Transient When "All Battery On" Command Returned Battery 6 to Operation in Orbit 15467.	Real Time & Off-Line	High current transient caused low voltage tripping USB timer prematurely and low voltage pneumatic interlock. A short is postulated in switching relay located in ALC. "All Battery Command restricted. Redesigned ALC for Landsat C.				
8/15/75	Battery 8 Turned Off	Real Time & Off-Line	Battery 8 decreased in load share and rose in charge share thereby causing high overcharge. Battery temperature rose and required turn off of battery in Orbit 15558. Battery 8 will not be reactivated except in an emergency due to "All Battery On' command restriction.				
4/20/76	Pitch Motor Driver Duty Cycle Increase.	On-Line	Similar to 12/4/72 entry - peaked at 35%. Returned to normal after rear scanner failure.				
4/22/76	Rear Scanner Electrical Failure	On-Line	Rear Scanner became electrically intermittent in Orbit 19078 and failed in Orbit 19086. S/C switched to single scanner mode (forward scanner) in Orbit 19089 and normal ACS operation resumed.				

BOLDOUT FO AME'

A1/

# LANDSAT-1

SPACECRAFT ORBIT REFERENCE TABLES

FROM JANUARY 1976 THRU DECEMBER 1977

ORBIT 17519 THRU 27711

FLIGHT DAY 1257 THRU 1987

										_
1		GMT	I FI TUHT	1	SPALECHAP	7 1	REFERENCE	I REF	CYCLE	Ī
1 0			DAY	í	3×3115	1	URBITS		N., .	i
	# /									-
	1 1	1	1 257	1	17519=1753	12	85 <b>-</b> 98	7 1	70	Ì
1	2 1	2	1 258	i	17533=1754	5 i	99-111	. 8	70	í
_ i	3 i	3	1 259	i	17546=1755	9 1	112-125	9	70	í
1	4	4	1260	i	17560-1757	73 i	126-139	i 10 i	70	í
	5 [	5	1261	L_	17574-1758	37	140-153	111	. 70	.1
1	6 1	6	1 1262		1758h=17o	1	154-167	12	70	Ī
1	7	7	1 1263	1	17602-1761	5	168-181	13	70	ĺ
1	8	8	1704	i	17610-1762	9 j	142-195	1 14	70	Ĺ
1	9	9	1 1265	1	17630-1764	3	196-209	15	70	i
1	10	10	1266	ï	17644-1769	7	210-223	16	70	ĺ
1	11	11	1267	1	17654-1767	1	224-237	17	70	ĺ
1	12	. ``12``	1268	i	17672 <b>-</b> 1762	5 j	238-251	18	70	i
i i	13	13	1 1269	i	1763n=1769	9	1 - 14	1 1	71	ĺ
1	14	14	1270	1	17700-1771	3	15= 28	2 1	71	i
1.	15	15	1271	1	17714-1772	7	<b>29-</b> 42	3 1	71	j
1.	16	16	1 1272	1	1772×-1774	1 1	<b>43</b>	1 4 1	71	İ
_L	17	17	1273	1.	17742-1775	5 <sub>[</sub>	57- 70	5	71	Ĺ
1	15	16	1 274	1	17756-1776	9	71 - 84	1 6 1	71	1
<b>J</b>	19	19	1 1275	1	17770=1778	3	85= 98	1: 7	71	İ
Ĺ	20 1	20	1276	1	17784-1779	16	99-111	1 6 1	71	j
_1	21 1	21	1277	1	17797-1761	0 1	112-125	9	71	İ
ł	55	55	1278	1	17811=1788	4	126-139	10 1	71	1 -
	23	۶3_	1279	Ĺ.	_17825=1753	8 [	140-153 _	111	71	1
· 1	24	24	1200	I	_17839=1785	2	154-167	12 1	71	ŀ
.1	25 ]	25	1281	1.	_1785J <b>=1</b> 736	6 [	168=181	13	71	1
1	26 -1	56	1202	1	17867-1738	0 1	132-195	1 14 1	71	1 :
_ l	27	27	1283	1	17831=1739	•	196-269	1 15	71	I
į	26	58	1 1254	ţ	17895-1790	) b	210-223	101	71	}
_l	24	29	<u>  1</u> 285 _	!	17909-1798	2	224=237	1 17 1	71	!
i	30 1	30	1256	1	17923-1793	6 [	238-251	1 10	71	1
1	31	31	1267	!	17937-1795	1 Q	1 = 14	1 1 1	, ,2	1.
										-

REPRODUCIBILITY OF T.
ORIGINAL PAGE IS POOK

FEB.1976

				•		
1		FI 19HT		I KEFEKENCE		CYCLE 1
DATE	LDAYI	DAY	L OKBIJS	<u> </u>	I DAY I	No. • 1
	T 35 T	1288	1 17951-17964	15- 28	L S 1	72
1 2 1	33 (	1289	1 17965-17978	29= 42	1 3 1	72 1
131	1. 34 .	1290	1 17979-17992	1 43 55	i 4 l	72
- 1 # 1 1	35	1291	1 17993-18006	ı 5 <b>7-</b> 70	1 5 1	72
51	36 1	1292	<u>  18007-18020</u>	71 • 84	1 <u> <u>6                            </u></u>	<u>72</u>
1 6:1	37	1293	1 18021-18034	85-98	7 1	72
. [ 7 : ]	38 1	1294	18035-18047	99-111	। है	ן 2ע
ادرا	39 1	1295	18046=18061	112-125	ı 9∃ı	72
1 9 1	<u> 40  </u>	1296	1 18062-18075	126-139	i 10 i	72
10 1	41	1297	18076-18089	140-153	j 11 j	72
111	42_1	1298	1 18090-18103	154-167	12 1	72
1 12	43	1299	18104-18117	158-101	13:1	72
1 13	1 44 ]	1300	1811a=18131	102-195	1 14	72
1 14	45	1301	18132-18145	196-209	15	12
1 15	46	1302	18146=18159	210-223	16	72
1 16	47 1	1303	18160-18173	224-237	17	72
1 17	1 46 1	1304	[: 18174 <b>-</b> 18187	238-251	18:1	72
1 18	49	1305	1 18130-18201	1 - 14	1 1	73
1 19	1 50 1	1306	1 18202-18215	15- 28	1 2 1	73
1 20	51	1307	18216-18229	29- 42	3 1	73
1 21	52	1308	18230-18243	1 43- 56	1 4 1	73
1 55	53	1309	18244-18257	5 <b>7-</b> 70	ı . 5 ı	73 1
23	54 1	1310	18258#18271	71-84	6 1	73
24	55 1	1311	18272-18285	1 85 <b>-</b> 98	7	73
25	56 1	1312	18236-18298	99•111	8	7 <b>3</b> . j
1 26	57	1313	18299-18312	112-125	i 9 i	73
27	58	1314	18313-18326	126-139	1 10	73
78	59	1315	18327-18340	ຳ 14ე•153	11	73
29	60	1316	1 18341-18354	154-167	12	73
	·					

M	AH	# 1	9	7	6

1	I GMT I	FLIGHT	I SPACECRAFT	I REFFRENCE	I REF I	CYCLE
DATE	LDAY_I	DAY	188817s	LBRBITS	[ DAY ]	Na •
11	61	1317	1 18355=18368	L _168=181	1 13 1	73
1 : 2	62	1318	18369-18382	182-195	1 14 1	73
<u> </u>	63	<u>1319</u>	18383-18396	196 <b>-2</b> 09	15	73
1 4	1 64 1	1320	18397-18410	210-223	1 16 i	73
1 5	65	1321	18411-18424	224-237	117_1	73
1 6	66	1322	18425-18436	238-251	18	73
7	67	1323	18439=18452	1 - 14	1 1 1	74
j s	68	1324	18453=18466	15= 28	1 2 1	74
9	69	1325	18467-18480	29- 42	] 3 ]	74_
1 10	70	1326	18481=18494	43- 56	1 4 1	74
1.1	71	1327	1 18495-18508	57- 70	5 1	74
12	72	1328	18509-18522	71 - 84	1 6 1	74
13	73	1329	18523-18536	85- 98	7	74
1 14	74	1330	18537-18549	99-111	1 8 1	74
1 15	75	1331	18550-18563	112-125	1 9 1	74
1 16	76	1332	18564=18577	126-139	10	74
1.7	77	1333	18578=18591	140-153	11.	74
1 18	78	1334	18572-18605	154-167	12	74
19	79	1335	18606-18619	168-161	13	74
1 50	1 80	1336	18620-18633	182-195	14	74
21	81	1337	1 18634-18647	196-209	15	74
1 55	82	1338	18640-18661	210-223	16	74
53	83	1339	18662-18675	224-237	17	74
1 24	84	1340	18676-18689	238-251	18	74
25	85	1341	18690-18703	1 = 14	1 1	75
1 26	86	1342	18704-18717	15 - 28	ا ق ا	75
27	87	1343	18718-18731	29- 42	j 3 j	75
58	88	1344	18732-18745	43= 56	i 4 i	75
29	89	1345	18746-18759	57- 70	5	75
1 30	90	1346	18760-18773	71 - 64	1 6 1	75
31	91	1347	18774-18787	85- 98	7	75

APR . 1976	

*******		<del></del>				,
1 _	GMT	FI IGHT	! SPACECRAFT	KEFFRENCE	I REF I	CYPLE
DATE	DAY	DAY	L GRBITS	LERBITS	L DAY 1	Nh.
		• • • • • • • •				
	65	1 348 _	<u>  18788-18300  </u>	99~111	] _8	75
1 2	93	1 1349	1 18801-18814	112-125	1 6 1	75
3	94	11350	[ 18815-18420 ]	126*139	1 10 1	75
1 4	95	1 1351	1 18829-18842	140-153	1 11 1	7 <u>5</u> i
1 5	96	1 1352	18843-18556	154-167	1 12 1	75
1 6	97	1 1353	18857-18870	168-161	(   13	75
l 7	98	1354	1 18871=18484 1	1 ^2*195	1 14 1	75
	99	1 1355	18085 <b>-1</b> 8490	196-209	1 15 1	75
1 9	100	1 1356	18899+18912	510-553	1 16 1	75
1 10	101	1 1357	18913-18926	224-237	1 17 1	75
111	102	1 1358	[ 18927-18940 ]	238-251	18	75 1
1 12	103	1 1359	18941-18954	1 - 14	1 1	76
1 13	1 104	1 360	18955-18968	15- 28	1 2 1	76
1 14	1 105	1 1301	18959-18982	29 ≈ 42	1 3 1	76 (
115	106	1 362	18933-18996	<b>43-</b> 56	1 4 1	76
1 10	107	1393	18997-19010	57 <b>-</b> 70	1 5 1	76
1 17	100	1 1364	1_19011=19024	71 - 84	1 6 1	76
1 18	109	1 365	19025-19038	85- 98	7 1	76
1 19	110	1 366	1 19039-19051	99-111	1 8	76
1 20	111	1307	19052-19065	112-125	j 9 j	76
1 21	112	1368	1 19055-19079	126-139	1 10 1	76
1 55	113	1 369	1 19050-19093	140-153	11	76
1 23	114	1370	1 19094-19107	154-167	12 1	76
1 24	115	1 371	19100-19121	168-181	13	76
25	116	1372	19122-19135	182-195	1 14 1	76
1 50	117	1373	19136-19149	196-209	1 15 1	76
27	118	1 1374	19150-19163	210-223	16	76
1 50	119	1375	19164-19177	224-237	17	76
29	120	1.376	19178-19191	238-251	18	76
1 30	121	1377	19192-19205	1= 14	1 1	77

#### MAY21976

		******					
13	1 GMT	1 FI IGHT	I SPACECR	AFT I REF	ERENCE	REF	CYCLE
LDATE	1 DAY	1 DAY	1 BHBITS		RBITS		
1_11	1155	1 1378	1_19206-192	219 1 1	5= 28	1 2 1	77
- 1 S	1 123	1379	1 19220-197	233   2	9- 42	3 1	77
_13	1.124	1380	1 19234-192	47 [ 4	3 - 56	j 4 j	77
4	1 125	1381	1 19248-198		7- 70	1 5 1	77
_15_	1 156	1 1382	1 19262-19	275   7	1 - 84	6 1	<del></del>
1 6	1 127	1 1353	1 19276-192		5- 98	7 1	77
	1. 159	1.384	1_19290-193		9-111	8 1	77
ो । ४	1 129	1 1385	1 19303-193		P <b>-1</b> 25	9 1	77
1 9	L 130	1386	19317-19	the state of the s	6-139	10 1	77
10	131	1 1387	1 19331-193		n=153	1111	77
11	T 135	1388	19345-193		4-167	12 1	77
1 12	1 133	1 1389	1 19359-193	372   16	8-181	13	77
13	1_134_	11390	<u> </u>		2195	114. 1.	77
1 14	1 135	1 1391	1 19387-194		5 <b>-2</b> 09	15	77
1 15	1 136	1.392	1.19401-194		5-223	16	77
¥ 16	1 137	1393	1 19415-194		4-237	17	77
1 17	1 138	1 1394	1 19429-194		3-251	18 1	77
1 18	1 139	1 1395	1 19443-194	1	1- 14	1 1 1	78
1 19	1 140	1_1396	1 19457-194	The second secon	5• 28 ]	L. 2 L	78
- I Su	1 141	1 1397	1 19471-194		9- 42	3 1	78
1 21	142	1398	1 19485-194		3 - 56	4 1	78
1 55	1 143	1399	1 19499-195		7- 70	5 1	78  -
1 23	1 144	1 400	1 19513-195		64	6 1	78
1 24	1 145	1 1401	1 19527-195	,	5• 98	7 1	78
1 25	1 146	1 1402	<u>19541=195</u>		9-111	8 1	78
1 50	1 147	1403	1 19554-195		2-125	9	78
1 27	148	1404	L19568-195		5 <b>-1</b> 39	10	78
1 54	149	1 1405	1 19582-195		153	11	78
T 59	150	1 1406	<u>  19596-196</u>		-167	12 1	78
1 30	151	1 1407	1 19610-196		1-181	13	78
31	152	1408	1 19624-196	37   182	•195 J	14	78

#### JUN#1976

DATE	DAY 1	FI IGHT DAY		I REFERENCE	I REF I	~ V ~ I ~
1 DATE 1	DAY_1	D A V				CYPLE
1 1		UAI	1 BRBITS	I GKGIIZ	L DAY I	Na (
1 1 1				~		,
	153	1409	19638-19651	L196-209	1 15 1	78
1 2 1	154	1410	19652-19665	i 210-223	1 16 1	78
1 3 1	155	1411	19666-19679	224-237	17	78
4 . [	156	1412	19680-19693	238-251	18	78
1 5 1	157	1413	19694-19707	1= 14	1 1 1	79
1 6 1	158	1414	19738-19721	15* 28	2 1	79
.171	159	1415	19722-19735	29= 42	3	79
1 8	160	1415	19736-19749	43- 56	4	79
<u> </u>	161	1417	19750-19763	5 <b>7-</b> 70	5	79
1 10	162	1418	19764-19777	71 - 84	6 1	79
1 11	163	1419	19778-19791	85 98	7	79
1 12 1	164	1420	19792-19804	99-111	8	79
1 13	165	1421	19805-19818	112-125	i 9 i	79
1 14 1	166	1422	19819-19832	126-139	10	79
1 15	167	1423	19833-19846	140-153	11	79
1 16 1	168	1424	19847-19860	154-167	12	79
1 17	169	1425	19861-19874	168-181	13	79
1 10 1	170	1426	19875=19488	182-195	1 14 1	79
1 19 j	171	1427	19889-19902	196-209	15	79
1 20 1	172	1428	19903-19916	210-223	10 1	79
21	173	1429	19917-19930	224-237	17	79
1 55 1	174	1430	19931-19944	238-251	18	79
1 23 1	175	1431	19945=19958	1= 14	1	80
1 24 1	176	1432	19959-19972	15- 28	2 1	#Q
1 25 1	177	1433	19973-19986	29- 42	3 :	# O
1 26 1	178	1434	19987-20000	43- 56	1 4 1	
27	179	1435	20001=20014	57 = 70	5	¥0
1 28	180	1436	20015-20028	71 = 34	6 1	- <u> </u>
1 29	181	1437	20029-20042	85 • 98	1 Z 1	a O
1 30 1	182	1438	20043-20055	99-111	<del> </del>	

4	11	1	4	9	7	4

DATE   DAY   DAY   SHOLTS   REFERENCE   REF   CYCLE							. <b></b>		_
DATE   DAY	- 1		I GMT I	FI 1GHT	I SPACECRAFT	I REFERENCE I	RFF I	CYCLE	l
1	1	DATE	L DAY	DAY			_		
7									•
2	1		1 163 ]	_ 1439	1 20056-20069	112-125	9 1	<u> </u>	ĺ
4   186   1442   2009n-20111   154-167   12   80     5   187   1443   20112-20125   168-181   13   +0     6   188   1444   20126-20139   182-195   14   40     7   189   1445   20140-20153   196-209   15   40     8   190   1446   20155-20167   210-223   16   +0     9   191   1447   20168-20181   224-237   17   40     10   192   1448   20182-20195   238-251   18   40     11   193   1449   20196-20209   1-14   1   +1     12   194   1450   20210-20223   15-28   2   41     13   195   1451   20224-20237   29-42   3   41     13   195   1451   20228-20265   57-70   5   41     14   196   1452   20238-20251   43-56   4   41     15   197   1453   20252-20265   57-70   5   41     16   198   1454   20266-20279   71-84   6   41     17   199   1455   20280-20293   85-98   7   41     19   201   1457   20307-20320   112-125   9   81     19   201   1458   2031-20334   126-139   10   41     20   202   1458   2031-20334   126-139   10   41     21   208   1459   20335-20348   140-153   11   41     22   204   1460   20349-20362   154-167   12   41     23   205   1461   20363-20376   168-181   13   41     24   206   1462   20377-20390   182-195   14   41     25   207   1403   20391-20404   196-209   15   41     26   208   1404   20405-20418   210-223   16   41     27   209   1465   20419-20426   238-251   18   41     28   210   1466   20433-20446   238-251   18   41     29   211   1467   20467-20460   1-14   1   42     30   212   1468   20461-20474   15-28   2   42	1	2	1 184	1440	1 20070-20083	126-139		80	1
5		3	<u>  185  </u>	1441	] 20084=20097	1 140-153	11	۵ د	
6	1	4	1 186	1442	2009a=20111	1 154-167	12	FO	1
7	1	<u>5</u>	187	1443	1_20112-20125	168-181	13	ا. ـــ ب ي خــــــ.	L
8	1				,	1 182-195	14	# O	
9	1					196-209	. 15 1	0	l
10				,				ا ٥٠	ļ
11	1					distribution of the control of	17	<u> </u>	l
12	- 1		•	•		1 238-251	18	FO 1	l
13	1	<del></del>				1- 14	1 1	1	ļ
14	J				• • • • • • • • • • • • • • • • • • • •			# <b>1</b>	l
15	_1			· · · · · · · · · · · · · · · · · · ·			3 1		ĺ
16	1							# <b>1</b> (	l
17	1					· · · · · · · · · · · · · · · · · · ·	5 (	#1 J	l
16	ı					, , ,		-	í
19	لــــا								L
20	1				,	,			ĺ
21						toward and the same of the same			İ
22	- 1					,			İ
23	1						to the second second	· · · · · · · · · · · · · · · · · · ·	١
24	1		, ,		,			- ,	-
25								— <b>7</b> I	l
26	1	-				· · · · · · · · · · · · · · · · · · ·	- ,		į
27   209   1465   20419-20432   2*4-237   17   11   21   28   210   1466   20433-20446   238-251   18   11   29   211   1467   20447-20460   1-14   1   1   12   130   212   1468   20461-20474   15-28   2   12		·,			1				t.
28	!				•		- ,	- ,	İ
29								· · · · · · · · · · · · · · · · · · ·	!
1 30   212   1468   20461-20474   15- 28   2   22	ļ						•		Ĺ
31   C13   1903   CU7/D=CU400   C7 4C   3   SC	!						-	•	ľ
	!		- E13		1 607/0760466	. 27- 42			ĺ

B-9

,	The contract of the contract o
	LANDSAT+1
	The state of the s
	AUG 1976

					,	
1	I GMT	FI IGHT	1 SPACECRAFT	I KEFERENCE	REF	CYPLE
DATE	1 DAY	I DAY	1 ORBITS	1 GRBITS	DAY	NA.
				*		
1 1	1 214	1 1470	20489-20502	43* 56	1 4	1 22 1
1 8	1 215	1 471	20503-20516	57- 70	5	82
3.	216	1472	20517-20530	71 - 84	6	12
1 4	1 217	1473	20531-20544	85- 98	7	F 2
1 5	218	1474	20545-20557	99-111	8	52
1 6	1 219	1 475	20558-20571	112-125	9	1.2
, 7	550	1 476	20572-20585	126-139	1 10	1 52
1 8	1 221	1 4477	20586-20599	140=153	1 11	<b>S2</b>
1 9	1 555	1 478	20600-20613	154-167	12	22
1 10	1 223	1479	20614-20627	168-181	13	1 24
1_ 11	1 224	1480	20628-20641	182-195	1 14	1 2 k
1 12	225	1481	20647-20655	196-209	15	E2 1
1 13	1 556	1482	20656-20669	210-223	1 16	22 I
1 14	227	1 1483	20670-20683	224+237	17	#2
1 15	1 558	1 1484	20684-20697	238-251	18	£2 1
1 16	1 258	1485	20698-20711	1 1 1 4	1 1	¥3
1 17	230	1486	20712-20725	15= 28	1 2 1	<b>    3</b>
1 16	1 231	1457	20726-20739	29- 42	3	, £3 j
1.9	1 535	1 488	20740-20753	43- 56	4	R3
1 50	1 233	1489	20754-20767	57. 70	5	£3
1 21	234	1490	20768-20781	71- 84	1 6	Ea
1 55	235	1491	20782-20795	85- 98	7	¥3
1 23	236	1492	20796-20808	99-111	, 8	23
1 24	1 537	1493	20809-20455	112-125	9	£3 (
1 25	238	1494	46805-E5805	126-139	10	E2 .
1 26	1 239	1495	20837-20850	140-153	11	83 I
27	1 240	1496	20851-20864	154-167	12	٤3 ا
1 28	1 241	1497	20865-20378	168-181	13	×3
1 29	1 242	1498	20879-20892	182-195	1 14	£3 (
1 30	1 243	1499	20893-20906	196-209	15	£3
31	1 244	1500	20907-20420	210-223	16	. <b>3</b> i

B-10

LA	NUS	AT	- 1
----	-----	----	-----

SEP 1976

	I GMT I	FIIGHT	SPACECHAFT L	REFERENCE	REF I	CYCLE
DATE	I DAY I	DAY	BRBITS	BRBITS		
1_	1 245	1501	20921-20934	224-237	1 17 1	#3
2	1 246	1502	20935-20948	238-251	18	<b>83</b>
3	1 247 1	1503	20949-20962	1= 14	1 1	<u>4</u>
y 4	1 248	1504	20963-20976	15- 28	2 1	24
5	249	1505	20977-20990	29- 42	3 1	44
6	250	1506	20991-21004	43= 56	1 4 1	24
	1 251 1	1507	21005-21018	57= 70	5 1	34
٥	252	1508	21019-21032	71= 64	6 1	<b>4</b>
9	253	1509	21033-21046	85- 98	;	<b>24</b>
10	1 254	1510	21047-21059	99-111	8 1	24
11	1 522	1511	21060-21073	112-125	9 1	s: 4
12	1 250 1	1512	21074-21087 1	126-139	10	۵4
13	L 257	1513	21086-21101	140-153	11	u 4
14	258	1514	21102-21115	154-167	12	ž. 4
15	1 259	1515	_21116-21129	168-181	13	24
16	1 500	1516	21130-21143	182-195	14	g 4
17	1 561 1	1517	21144-21157	196-209	i 15 i	si 4
18	1 262	1518	21150-21171	210-223	16	44
19	L 263	1519	21172-21185	224-237	17	84
20	1 26# 1	1520	21186-21199	238-251	18	24
21	265	1521	21200-21213	1 = 14	1 1	5
55	266	1522	21214-21227	15- 28	2 1	25
23	267	1523	21228-21241	29- 42	3	£5
24	268	1524	21242-21255	43- 56	4 1	£5
<u>25</u>	269	1525	21256-21269	57- 70	5	45
- 26	270	1526	21270-21283	71- 84	6 1	ء 5
27	271	1527	21284-21297	85= 98	7	£5
28	272	1528	21298-21310	99-111	1 8 1	۸5
29	273	1529	21311-21324	112-125	9	15
30	274	1533	21325-21338	126-139	10 1	

LS-1

	_	
1 - 4	ı. Nı 🗆	T-1

#### BCT . 1976

1	I GMT	FI IGHT	SPACE CRAFT	REFERENCE	REF	CYPLE
1 DATE	I DAY	DAY	BKBITS	BRBITS	DAY I	NH • I
1 1	1 275	1531	21339-21352	140-153	11	<u>. 53   </u>
. 1 5	1 276	1532	21353-21366	154-167	12	<b>₽</b> 5
1 3	1 277	1533	21367-21380	168-181	13	<u></u> 5 <u>l</u>
1 4	1 278	1534	21381-21394 1	182-195	14	£5
1 5	1 279	1535	21395-21408	196-209	15	<u> </u>
1 6	1 580	1536	21409-21422	210-223	16	s5
	281	1537	21423-21436	224-237	17 (	
ة <sub>ا</sub>	1 585	1538	21437-21450	238-251	18	٤5 ا
1 9	1 283	1539	21451-21464	1- 14	1_1	R6
1 10	1 284	1540	21465-21478	15= 28	2 1	۱ 6ء
1 11	285	1541	21479-21492	29- 42	3 1	#6 J
1 12	1 286	1542	21493-21506	43- 56	4	£6
1 13	287	1543	21507-21520	57* 70	5	g6
1 14	1 288	1544	21521-21534	71 - 84	6	. 86
1 15	1 289	1545	21535-21548	85= 98	7	#6 I
1 16	1 590	1546	21549-21361	99-111	8	26
1 17	1 291	1547	21562-21575	112-125	9 1	46
1 18	585	1545	21576-21589	126-139	10	R6
1 19	1 593	1549	21530-21603	140-153	11 i	g6
1 50	1 294	1550	21604-21617	154-167	12	я6
) 21	1 295	1551	21618-21631	168-181	13	26
1 55	1 296	1552	21632-21645	182-195	14 1	£6  -
53	1 297	1553	21646-21659	196-209	15	a6
1 24	298	1554	21660-21673	210-223	16	R6
25	299	+55 <del>5</del>	21674-21687	224-237	17 i	26 j
1 26	1 300	1556	21688-21701	238-251	18	26 1
27	1 301	1557	21702-21715	1 = 14	1 1	£7
1 28	305	1558	21716-21729	15- 28	2 1	£7
l 59	1 303	1559	21730-21743	29- 42	3	, a 7
1 30	1 304	1560	21744-21757	43- 56	4 1	B7
1 31	305	1561	21754-21771	57- 70	. 5 i	e7. j

د	=	š	,	•	9	7	5	

1	347	F Jum'	SPACECHAFT	REFFRENCE	REF	EY FLE
1 DATE	<u>, 24Y</u>	DAY	eriiti	548175	Day <u>.</u>	<b>.</b>
	<u> 1</u> 306 .	•••	<sub>3:</sub> 21772-21785	7 • £4	<u>=</u> :	<u># 7</u>
7	1 307	1563	21786-21795	<u> </u>	. 7	<b>₽</b> 7
_ 13	1_308	1564	21400-21*12	. 99-11:	. <u></u>	<u> </u>
1 💇	, 309	• <u>5</u> = 5	21613-21820	112-125	9	# <u>7</u>
1 5	310	<u>• 555</u>	<u>. </u> 21827#21542_	126-139	<u> 1</u> 0	<u> = 7</u>
r p 👝°	. 311	·5e7	. 21841-21454	140-153	4.4	¥7.
7	31¢	+5=6	21855-21466	154-167	18	<b>\$</b> 7
	3:3	1209	2156=*214R2	: 154 = 161	1.2	<b>17</b>
1 5	314	• • <del>•</del> • • • • • • • • • • • • • • • •	_ 21685-21R96	1+2-195_	i ; <b>1.4</b> i i	<u> </u>
1 10	1 315	• 5 7 1	21897-21910	194 <b>-2</b> 09	15	£ 7
1 11	316	•572	219:1-2:324	215-223	. 16	, <b>s</b> 7
12	317	1573	21925-21-36	224-237	17	<b>#7</b>
1 13	.i 3:6	4574	<u> 21934-21952</u>	238-25;	10	£7 :
1 4	319	4575	21953-21960	4 = 14	1	i 5
1 15	320	·576	2:957-2:980	15- 25	2	<b>5</b> 5
1 16	321	577	21931-21994	29- 62	3	4.8
17	322	+576	. 2193n=22000	43- 50	41 1	L 8
1.15	323	-79	∠20022 22	57. 7	5	. 5
19	32+	4563	20023-22/35	715 54	<b>.</b>	£ 8
. 2:	325	1581	22037-22050	-F- 95	7	£ 8
21_	326	1552	22051-22063	99-111	<b>.</b>	<b>.</b> 8
	37	1563	22064-22077	1.2-125	9 ,	s 8
, 23	328	584	2207=2219:	126=139	1 .	<b>.</b> 8
26	329	.565	22092-22105	140-153	111	. 8
25	330	1500		154-157	12	. 8
56	331		2212 - 22123	165-161	13	. 8
27	, 332	1568	22134-22147	182+195	14	. 8
70	333	-569	27144-22161	196-209	15	. 8
29	335	. 592	22162-22175	215-223	16	
32	335	-591	= 22176-22169	224-237		. 8

5-1

LANDSAT-1

DEC . 1976

	I GMT	FI IGHT	SPACECRAFT I	- REFERENCE	REF	I CYCLE I
DATE	I DAY	DAY	I BRBITS		DAY	l Ne •
1	336	1592	22190-22203	238=251	18	, ×8 j
2	337	1593	22204-22217	1 = 14	1	≰9
3	338	1 1594	27216-22231	15= 28	2	. 9
4	339	1 595	22232-22245	29- 42	3	<b>.9</b>
5	1 340	1 1596	22246-22259	43= 56	4	ا 9ء ا
b	341	1 1597	22260-22273	5 <b>7-</b> 70	5	<b>×9</b>
7	1 342	1 1598	22274-22287	71- 64	6	. 9
8	1 343	1599	22230-22301	` ⊁≒= 9∄	7	. 9
9	344	1600	22302-22314	99-111	8	<b>⊭9</b>
10	345	1 1601	22315-22128	112-125	9	19
11	346	1602	22329-22342	126-139	10	.9
12	1 347	1 1603	22343-22356	140-153	11	£9
13	348	1604	22357=22370	154-167	12	9 یا
14	349	1605	22371-22384	168=181	13	٤9
15	350	1605	22385-22398	182-195	:14	وء
16	351	1 1607	22394-22412	196-209	15	9 ی
17	352	1608	22413-22426	210-223	16	£9
18	353	1609	22427-22440	224-237	17	6.9
19	354	1610	22441-22454	238=251	18	9 نا
20	355	1611	22455-22468	1-14	1	90
21	356	1612	22469-22482	15= 28	2	90
55	357	1613	22483-22496	29- 42	3	<b>¤0</b>
23	358	1614	22497-22510	<b>43</b> ≈ 56	4.	80
24	359	1615	22511-22524	57- 70	5	90
25	360	1616	22525-22538	71 - 84	6	90
56	361	1617	22539+22552	85= 98	7	90
27	362	1618	22553-22565	99-111	8	80
24	363	1619	22566-22579	112-125	9	90
29	364	1620	22580-22593	126=139	10	۵0 ا
30	365	1621	22594-22607	140-153	11	90 1
31	366	1 1622	22608-22621	154-167	12	40

•	,
٠_	LANDSAT-1
• -	

	Į.	GMT	i FI IGHT	I SPACECRAFT	REFERENCE	REF	CYCLE
	DATE	DAY	DAY	J SRBITS	L GROITS	DAY	NA •
	<u> </u>	1	1 1623	1 22622-22635	168-181	13	90 1
	1 2	1 2	1 1624	22636-22649	182-195	14	90
	3	3_	1 1625	1 22650-22663	196-209	15	90 1
	į. 4 i		1626	22664-22677	210-223	16	90
	1 5	5	1627	22678-22691	224-237	17	90 i
	1 6	6	1 1628	22692-22705	238-251	18	90
	1 7	7	1 1629	22706-22719	1= 14	1 1	91
	1 8	8	1 1630	22720-22733	15- 28	2	01
	9	9	1631	22734-22747	29- 42	3 1	<b>e1</b> i
	1 10	10	1632	22748-22761	43- 56	4	91
	1 11	11	1 1633	22762-22775	57- 70	5_i	91 1
	1 12	12	1 1634	22776-22789	71 = 84	6	91
	1 13	13	1635	22790-22803	85- 98	7	91
	1 14	1 4	1636	22804-22816	99-111	8	91
	15	15	1637	22817-22430	112-125	9	91
	1 16	16	1638	22831-22844	126-139	10	01
	17	17	1639	22845-22858	140-153	11	ai i
	18	18	1640	22859-22872	154-167	12	91
	19	19	1641	22873-22886	168-181	13	91 1
	1 50 1	50	1642	22887-22900	182-195	14	91
	21	21	1643	22901-22914	196-209	15	<b>a1</b> i
- 1	1 55 1	22	1644	22915-22928	210-223	16	91
	23	23	1645	22929-22942	224-237	17 i	91
	24	24	1646	22943-22956	238-251	18 (	91
	25	25	1647	22957-22470	1- 14	1 i	02
(	1 56	26	1648	22971-22984	15- 28	5 1	92
	27	27	1649	22985-22998	29- 42	3	92
. 1	28	28	1650	22999-23012	43- 56	4 1	92
	29	29	1651	23013-23026	57- 70	5	92
	) 30 J	30	1652	23027-23040	71- 84	6	92
	31	31	1653	23041-23054	85- 98	7 1	92

LS-1

L	N	מ	a	•	٣	•

#### FEB-1973

-	l (	; GMT	FLIGHT	: SPACECRAFT	REFFRENCE	REF	CYPLE
i	DATE	DAY	DAY	STIERE	BRBITS	DAY	NA
1	1	32	1654	23055-23067	99-111	1. 8 1	92
1	2	33	1655	23064-23081	112-125	9	92
i	. 3	34	1656	23082-23095	126-139	15	92
Ī	4	35	1657	23096-23109	1+0-153	11	92
1	5	36	1658	23110-23123	15+-167	12	92
ī	6	37	1659	23124-23137	168-181	13	92
_1	7	38	1660	23138-23151	182-195	14	92
1	8	39	1661	23152-23165	196-209	15	92
_1	9	40	1602	23166-23179	210-553	16	92
1	10	41	1663	23180-23193	224-237	17	92
	11	48	1664	23194-23207	238-251	18_i	92
1	12	43	1665	23230-23221	1 - 14	1 1	43
_1	13	44	1656	23222-23235	15- 28	2	a <b>3</b>
Ī	14	45	1667	23236-23249	29• +2	3	-3
	15	46	1608	23250-23263	<b>43-</b> 56		9
1	16	47	1669	23264-23277	57- 70	5	a <b>3</b>
_1	17	48	1670	: 2327 <sub>8</sub> -23291 :	71 + 84	. 6	<b>a</b> 3
1	18	49	1671	23292-23305 :	85- 98	7	<b>a 3</b>
1	19	50	1672	23306-23318	99-111	8	0.3
. 1	50	51	1673	53319-53335	112-125	9	93
1	21	52	1674	23333-23346	126-139	10	a <b>3</b>
1	55	53	1675	233+7-23360	140-153	11	a <b>3</b>
1	. 53	54	1676	23361-23374	154=167	12 1	<b>a</b> 3
1	24	55	1677	23375-23388	168-151	13	<b>a3</b>
1	<b>2</b> 5	56	1678	23339-23402	182-195	14 i	<b>c3</b>
. 1	30	57	1679	23403-23+16	196-209	15	0.3
_	27	58	1680	23417-23430	210-223	16	6.3
1	58	59	1681	23431-23444	224-237	17	63

MAR-1977

••••••						
F 1	GMT	I FIIGHT	SPACECRAFT	HEFFRENCE	I REF I	CYPLE
DATE	DAY	I DAY	L 8R∃ITS	ARBITS	L DAY I	Nn • I
11	60	1682	1_23445-23458	238-251	18	93 (
1 5 1	61	1 1683	23459-23472	1-14	1 1 1	04 1
	95	1684	23473=23486	15. 28	_ s i	94
1 4 1	63	1 1685	23457-23500	29- 42	3 1	04
5	64	1686	23501-23514	L 43- 56	4 1	94
1 6 1	65	1 1687	23515-23528	57- 70	5 1	94
7	6.6	1668	23529-23542	71- 84	6	94
1 8 1	67	1 1689	23543-23556	85- 98	7 1	94
9 1	68	1690	23557-23569	99-111	8	94
1 10 i	69	1691	23570-23583	112-125	9 1	94
	70	1692	23584-23597	126-139	10	94
1 12 1	71	1693	23598-23611	140-153	11	94
1_13	72	1694	23612-23625	154-167	12	94
1 14 1	73	1695	23626-23639	168-18:	13	94
15	_74	1696	23640-23653	182-195	14	94
1 2.6	75	1697	23654-23667	196-209	15	04
17	76	1698	23668=23681	210-553	16	94
1 12	77	1699	23682-23695	224-237	17:1	94 1
191	78	1700	23696-23709	238-251	18	94
1 20 1	79	170%	23710-23723	1= 14	1	e <b>5</b>
	80	1702	23724-23737	15= 28		a <b>5</b> i
1 22 1	81	1703	23736-23751	29- 42	3	95
23	82	1704	23752-23765	#3= 56 i	4	95
1 24 1	83	1705	23766-23779	57- 70	5 1	95
25	84	1706	23780-23793	71 = 84	6	a <b>5</b>
1 26 1	85	1707	23794-23407	85* 98 (	7 1	95
27	86	1708	23808-23320	99-111	8	95
1 58 1	87	1709	23821-23834	112-125	9 1	95
1 29 1	88	1710	23835-23448	126-139	10 i	9 <b>5</b>
1 30 1	89	1711	23849-23862	140-153	11 1	o5 i
1 31 1	90	1712	23863-23976	154-167	12	95

REPRODUCIBILITY OF TO ORIGINAL PAGE IS POOR

# APR =1977

1	I GMT	I FI IGHT	I SPACECRAFT	I REFFRENCE	Dee	CYOLE
DATE	DAY	DAY	BRBITS			
0 7 7 7		<u> </u>	1 049112	BRBITS	DAY	N==
. 1	91	1713	. 30977-00JOA	•	4	
1 2	92	1714	23877-23890	168-181	13	<u> </u>
1 3	93		23891-23904	182-195	1 14 1	95
	·	1 1715	23905-23918	196-209	1 15	<u> </u>
,	9#	1 1716	23919-23932	210-223	1 16	-5
1 5	95	1 1717	1 23933-23946	224-237	1 17	95
1 6	96	1718	1 23947-23960	238-251	18	<b>a</b> 5
1 7	97	1 1719	1 23961-23974	! 1- 14	1 1 1	96
1 8	98	1 1720	1 23975-23988	15- 28	1 2 1	96
9	99	1721	1 23989-24002	29- 42	1 3 1	۵6
1 10	100	1722	24003-24016	43- 56	4	96
1 11	101	1 1723	1 24017-24030	57- 70	5	a <b>6</b>
1 12	102	1724	1 24031-24044	71-84	1 6 1	96
1 13	103	1 1725	1 24045-24058	85- 98	. 7 i	96
1 14	104	1726	1 24059-24071	99-111	8 1	96
1 15	105	1727	24072=24085	112-125	9	96
1 16	106	1728	1 24086-24099	126-139	10	96
1 17	107	1729	24100=24113	140-153	11	96
1 18	108	1730	1 241' 24127	154-167	12 1	96
1 19	109	1731	24128-24141	168=181	1 13	96
1 20	110	1732	24142-24155	182-195	14	96
1 21	111	1733	24156-24169	196-209	15	96
55	112	1734	1 24170-24183	210-223	16	96
23	113	1735	24184-24197	224-237	17	96
24	114	1736	1 24198-24211	238-251	18	96
25	115	1737	24212-24725	1 + 14	1 1	97
1 26	116	1738	24226-24239	15- 28	2 1	- <del>3</del> 7
27	117	1739	1 24240-24253	29- 42	1 3 1	
28	115	1740	1 24254-24267	43- 56	1 4 1	9 <u>7</u>
29	119	1741	1 24268-24281	* .		
30		1742	,	57- 70	1 5 1	97
1 -0 1	120	1/76	1 24282-24295	71 - 84	1 6 1	97

#### MAY21977

1	GMY	FI IGHT	SPACECRAFT	REFERENCE	REF !	CYCLE
DATE	DAY	DAY	ARBITS	BRBLIS	DAY	Na
				••••••		
1_1_	121	1 1743	24296-24309	85- 98	7 1	<u>97</u>
1 2	122	1744	24310-24322	99-111	1 8 1	9.7
1 3	123	1 1745	24323-24336	112-125	9_1	<u>97</u>
1 4	124	1746	24337-24350	126-139	1 10 1	97
5	125	1747	24351-24364	140-153	111	<u> </u>
1 6	126	1748	24365-24378	154-167	12 1	9.7
7	127	1749	24379-24392	168-181	13	<u>a7</u>
1 8	128	1750	24393-24406	182-195	1 14 1	a 7.
9	129	1 751	24407-24420	196-209	15	ュフ
1 10	130	1752	24421-24434	210-223	16	a7
1 11	131	1753	24435-24448	224-237	17_	97
1 12	132	1 1754	24449-24462	238-251	18	a٦
1 13	133	1755	24463-24476	1 1- 14	1_1	98
1 14	134	1756	24477-24490	15= 28	2 1	98
1 15	135	1757	24491-24504	29- 42	<u>.</u> 3 i	98
1 16	136	1 1758	24505-24518	43- 56	1 4 1	98
1. 17	137	1759	24519-24532	57= 70	1 5	98
1 18	138	1760	24533-24546	71-84	6	98
19	139	1761	24547-24560	85= 98	7	68
1 20	140	1762	24561-24573	99-111	8 1	98
21	141	1763	24574-24587	112-125	9 1	۹8
22	142	1764	24588-24601	126-139	10	98
23	143	1765	24602-24615	140-153	11 1	<b>a8</b>
1 24	144	1766	24616-24629	154-167	12	98
i <b>2</b> 5	145	767	24630-24643	169-181	13	⇒8
1 26	146	1768	24644-24657	182-195	34	98
27	147	1769	24658-24671	196-209	15	98
28	148	1770	24672-24685	210-223	16	98
29	149	1771	24686=24699	224-237	17	98
1 30	150	1772	24700-24713	238-251	18	98
31	151	1773	24714-24727	1= 14	, ,,	9

B-19

## JUN31977

	GMT	FI IGHT	I SPACECHAFT	REFERENCE	REF	I CYPLE
DATE	DAY	DAY	BRBITS	BRBITS	DAY	NAT
1	1 152	1 1774	1 24728-24741	15- 28	. 2	9
5	153	1775	24742-24755	29* 42	1 3	99
3	154	1776	24756=24769	47 56	1 4	49
	155	1777	1 24770-24783	57- 70	5	9
5	156	1778	24784-24797	71 = 84	. 6	9
6	157	1779	24798-24811	85- 98	7	29
7	158	1780	24812-24824	99-111	Ŕ	99
8	159	1781	24825-24838	112-125	8	- 9
9	160	1782	24839-24352	126~139	10	99
10	161	1783	24853-24866	140-153	11	60
11	162	1784	24867-24480	154-167	12	9
15	163	1785	24881-24894	168-181	13	9
13	164	1786	24895-24908	182-195	14	9
14	1 165	1787	24909-24922	196-209	15	9
15	166	1788	24923-24936	210-223	16	99
16	167	1789	1 24937-24950	224-237	17	99
17	168	1790	1 24951-24964 1	238-251	18	9
18	169	1791	24965-24978	1= 14	1	1-0
19	170	1792	24979-24992	15- 28	ž į	100
50	175	1793	24993-25006	29- 42	3	150
21	172	1794	25007-25020	43- 56	4 :	1.0
22	173	1795	25021-25034	57= 70	5	100
53	174	1796	25035-25048	71 - 84	6 1	150
24	175	1797	25049-25062	85- 98	7	100
25	176	1798	1 25063-25075	99-111	8 :	150
26	177	1799	1 25076-25089 1	112-125	9	100
27	178	1800	25090-25103	126-139	10	100
28	179	1801	25104-25117	140-153	11	100
59	180	1802	25118-25131	154-167	12	160
30	181	1803	25132-25145	168-181	13	100

LS-1

#### \_JUL#1973

OATF   DAY   DAY   SPACECRAFT   REFERENCE   REF   CYCLE							
DATE   DAY   DAY   GRBITS   GRBITS   DAY   N6.	· •	1 GMT	I FI IGHT	I SPACECRAFT	I REFFRENCE	REF	CYCLE
1	DATE	DAY	DAY	I BRBITS	L BRBITS		
2							
3	11	1 162	1 1804	1 25146-25159	182-195	1 14 1	100
4			1 1805	25160-25173	1 196-209	15	100 1
4	3	1 184	1806	25174-25187	210-223	16 i	100
1	1 4	1 185	1 1807	25188-25201	224-237	17	
7				25202-25215	238-251	18	100 i
8   189   1811   25244-25257   29-42   3   101     9   190   1812   25258-25271   43-56   4   101     10   191   1813   25272-25285   57-70   5   101     11   192   1814   25286-25299   71-84   6   101     12   193   1815   25314-25326   99-111   8   101     13   194   1816   25314-25326   99-111   8   101     14   195   1817   25327-25340   112-125   9   101     15   196   1818   25341-25354   126-139   10   101     16   197   1819   25355-25368   140-153   11   101     17   198   1829   25355-25368   140-153   11   101     18   199   1821   25383-25396   168-181   13   101     19   200   1822   25397-25410   182-195   14   101     20   201   1823   25411-25424   196-209   15   101     21   202   1824   25425-25438   210-223   16   101     22   203   1825   25439-25452   224-237   17   101     23   204   1826   25453-25466   238-251   18   101     24   205   1827   25467-255480   1-14   1   102     25   206   1828   25431-25494   15-28   2   102     26   207   1829   25495-25538   29-42   3   102     27   208   1830   25509-25522   43-56   4   102     28   209   1831   25523-25564   85-98   7   102     29   210   1832   25537-25550   71-84   6   102     20   211   1833   25551-25564   85-98   7   102	1 6	, -	1 1809	25216-25229	1 1- 14	1 1 1	101
8	7		1810	25230-25243	15- 28	1 2 1	101
10		1 189	1811	25244-25257	29- 42		101
11			1812	<u>  25258-25271</u>	43 - 56		101
11	1 10	1 191	1 1813	25272-25285	57- 70	5 1	101
12		1 192		25286-25299	1 71 - 84	6 1	
14			1815	25300-25313	85- 98		101
15			1 1816		99-111	8	101
16			1817	25327-25340	112-125	1 9 1	101
16			1818	25341-25354	126-139	10 1	101
18		1 197	1819	25355-25368	1 40-153	11	
19	17	1 198	1823	25369-25382	154-167	12	101
20		• -	1821	25383-25396	168-181	13	101
20	19	1 200	1822	25397-25410	182-195	14	1-1
21	1 50	1 501	1823	25411-25424	196-209	15	
22	1 51	1 505	1 1824	25425-25438	210-223	16_i	
23		_		,	224-237	17	
24		1 204	1826	25453-25466	238-251		_ ,
26	7	• -		,	1 1 1 4	- 1 1	
27   208   1830   25509-25522   43-56   4   1n2   128   209   1831   25523-25536   57-70   5   1n2   129   210   1832   25537-25550   71-84   6   1n2   120   211   1833   25551-25564   85-98   7   1n2					15= 28	2	102
28   209   1831   25523-25536   57-70   5   1n2     29   210   1832   25537-25550   71-84   6   1n2     30   211   1833   25551-25564   85-98   7   1n2		,			29- 42	3	
29   210   1832   25537-25550   71-84   6   1-2							102
1 20   211   1833   25551-25564   85 98   7   102				•		5 1	102
						6	102
1 31   212   1834   25565-25577   99-111   8   102					85× 98	7 1	102 1
	31	1 212	1834	<u> 25565-25577</u>	99-111	8	102

B-21

#### AUG-1977

	••••					
1	, GMT	FIIGHT	I SPACECRAFT	I REFERENCE	REF	CYPLE
DATE	DAY	DAY	9RBITS	L ORBITS	DAY	Nr.
				• • • • • • • • • •		
	1 213	1 835	25578-25591	112-125	9 1	102
1 2	1 214	1836	25592-25605	126-139	10	172
i3	215	1837	25606-25619	140-153	11	172
1 4	1 216	1838	25620-25633	154-167	12	172
5	1 217	1 1839	1 25634-25647	168-181	13	1 12 1
1 6	218	1 1840	25648-25661	182-195	14	12
7	1 219	1 1841	25662-25675	196-209	15	102
1 8	1 550	1 1842	1 25676-25689	210-223	16	102
9	1 221	1 1843	25690-25703	224-237	17	102
1 10	1 558	1844	25704-25717	238-251	18	1-2
1 11	223	1 1845	25718-25731	1= 14	1	103
1 12	1 224	1 1846	25732-25745	15= 28	5	103
1 13	225	1 1847	25746-25759	29- 42	3	103
1 14	1 226	1848	25760-25773	43= 56	4	103
15	227	1849	25774-25787	57- 70	5 1	103
1 16	1 558	1 1850	25788-25801	71-84	6 1	103
1 17	229	1 1851	25802-25815	85= 98	7	1.3
1 18	230	1852	25816-25828	99-111	8	103
1 19	231	1853	25829-25842	112-125	9 1	103
1 20	1 535	1 1854	25843-25856	126-139	10	103
1 21	533	1855	25857-25370	140-153	11	103
1 55	1 234	1 1856	25871-25884	154-167	12	1.3
23	235	1857	25885-25498	168-181	13	103
1 24	1 236	1858	25899-25912	182-195	14	103
25	237	1859	25913-25926	196-209	15	163
1 26	23%	1860	25927-25940	210-223	16	103
1 27	239	1861	25941-25954	224-237	17	103
1 58	240	1862	25955-25968	238-251	18	103
1 29	241	1863	25969-25782	1- 14	1 1	104
1 30	242	1864	25983-25996	15- 28	2 !	104
31	243	1865	25997-26010	29- 42	3 1	104
			·			

B-22

# SEP#1977

	GMT	1 FIIGHT	I SPACECRAFT	REFERENCE	PEF	CYCLE
DATE	DAY	I DAY	H BHBITS	BRBITS	DAY	-
			1 2 2 2 2 2 2		I DAT ]	NH •
1 1	244	1 1866	1 26011-26024	43= 56		104
1 2	245	1 1867	1 26025-26038	57- 70	1 5 1	
i 3	246	1868	26039-26032	71 - 84	; 5 ;   6 ;	104
1 4	247	1 1869	1 26053-26066	85- 98	7 1	104
5	248	1 1870	1 26067-26079	99-111	, , , , 8 ,	104
1 6	249	1871	1 26080-26093	112-125	9 1	104
i 7	250	1872	1 26094-26107	126-139		104
1 8	251	1 1873	1 26108-26121	140-153	101	104
9	252	1874	26122-26135	154-167	12 1	
1 10	253	1 1875	26136-26149	168-181	13 1	104 104
1 11	254	1 1876	26150-26163	182-195	,	
1. 12	255	1877	1 26164-26177	196-209	1 15	104 104
13	256	878	26178-26191	210-223	15	
1 14	257	1879	26192-26205	224-237	1 17	104
15	258	1880	26206-26219	238-251	18	104
1 16	259	1881	1 26250-56533	1 = 14		1.5
17	260	1882	26234-26247	15= 28	1 2 1	105
1 18	261	1883	26248-26261	29= 42	<u> </u>	155
19	262	1884	26262-26275	43 <b>-</b> 56	, <u> </u>	1 1 5
1 50	263	1885	26276-26289	57- 70	5 ;	105
21	264	1886	26290-26303	71 - 84	6	1.5
1 55	265	1887	26304-26317	85- 98	7 1	105
53	266	1858	26318-26330	99-111	8 1	1,5
1 24 1	267	1889	26331-26344	112-125	9 1	125
25	268	1890	26345-26358	126-139	10	105
1 26	269	1891	26359-26372	140-153	11	1,5
27	270	1892	26373-26386	154-167	12	1.5
28	271	1893	26387-26400 1	168-181	13	105
<u>i</u> 29 i	272	1894	26401-26414	182-195	14	105
1 30 1	273	1895	26415-26428	196-209	15	105

# BCT . 1977

•••••				*********		
1	GMT	I FI IGHT	I SPACECRAFT	I HEFERENCE	I REF I	CYTLE
I DATE	1 DAY	I DAY	I BRBITS	I BRBITS	1 DAY 1	Nuo
• • • • • • •						
1_1_	274	1 1896	1 26429-26442	1 510-553	1 16 1	<u> 1 🤈 5</u>
1 5	275	1 1897	1 26443-26456	1 224-237	1 17 4	1.5
1 3	276	1 1898	1 26457-26470	238-251	1 18 1	<u> </u>
1 4	277	1 1899	1 26471-26484	1 1- 14	1 1 1	1n6
5	278	1 1900	1 26485-26498	1 15- 28	1 2 1	1n6
, 6	279	1 1901	1 26499-26512	29- 42	1 3 1	166
7	1 580	1 1902	26513-26526	1 43- 56	1 4 1	176
1 8	1 581	1 1903	26527-26540	1 57- 70	5 1	106
9	585	1 1904	26541-26554	71 = 84	6	106
1 10	1 593	1 1905	26555-26568	85- 98	1 7 1	106
1 11	284	1 1906	26569-26581	99-111	8	1n6
1 12	285	1 1907	26582-26595	112-125	9 1	106
1 13	1 286	1 1908	1 26596-26609	1 126-139	10	1.6
1 14	287	1909	1 26610-26623	1 140-153	1 11 1	106
1 15	288	1910	1 26624-26637	1 154-167	12 1	176
1 16	289	1 1911	1 26638-26651	168-181	13	176
1 17	590	1 1912	26657-26665	1 182-195	1 14 1	106
1 18	591	1913	1 26660=26679	196-209	15	106
1 19	593	1914	1 26680-26693	210-223	16	166
1 50	293	1 1915	1 26694-26707	224-237	17	106
1 21	294	1916	126708-26721	238-251	18	1-6
1 55	295	1917	1 26722-26735	1 1- 14	1 1 1	107
23	296	1918	26736-26749	15- 28	2 1	107
1 24	297	1919	1 26750-26763	29- 42	3 (	10%
25	298	1920	26764-26777	1 43- 56	1 4 1	157
1 26	299	1921	26778-26791	57- 70	5 1	10.7
27	300	1922	1 26792-26805	71 - 84	6 1	107
78	301	1923	1 26806-26819	85= 98	7 1	107
29	305	1924	1 56850-56435	99-111	8 1	107
30	303	1925	26833-26846	112-125	9 1	107
31	304	1926	26847-26860	126-139	10 i	107

#### LANDSATes

#### NOV#1977

	- CM7			******		
	GMT	I FI IGHT	I SPACECRAFT	I REFERENCE	REF	I CYCLE
DATE	DAY	L DAY	<u> BRBITS</u>	<u>erbits</u>	1 DAY	NA e
******	•••••	• • • • • • • • •		*		
	305	1 1927	<u>  26861-26874  </u>	140-153	1 11	107
1 5	306	1 1928	1 26875=26888	1 154-167	12	107
1 3	307	1929	26859-26702	168-181	1 13	107
1 4 1	308	1930	26903-26916	182-195	1 14	1 17
5	309	1931	1 26917-26930	196-209	15	107
1 6	310	1932	26931-26944	1 210-223	16	107
7	311	1933	26945-26958	1 224-237	17	107
. 8	312	1 1934	26959-26972	238-251	18	107
9	313	1935	26973-26986	1 1 1 4	1 1	108
1 10	314	1936	26987-27000	15- 28	1 2	108
11	315	1937	27001-27014	29- 42	3	1.5
1 12	316	1938	27015-27028	43- 56	4	108
13	317	1939	27029-27042	57- 70	. 5	1.58
1 14	318	1940	1 27043-27056	71-84	6	1.8
1 15	319	1941	27057-27070	85- 98	, J	168
1 16	320	1942	27071-27083	99-111	8 1	108
17	321	1943	27084-27097	112-125	, 9,	108
18	355	1944	27098-27111	126-139	10	1.8
19	353	1945	27112-27125	140-153	1 11 1	108
50	324	1946	27126-27139	154-167	12 1	108
21	325	1947	27140-27153	168-181	13	108
55	326	1948	27154-27167	182-195	14	
23	327	1949	27168-27181	196-209	15	108
24	328	1950	27182-27195	210=223		<u> 108</u>
25	329	1951	27196-27209	224-237	16 j	1.58
1 25	330	1952	27210-27223	238-251	17	108
27	331	1953	27224-27237	·	101	108
1 58 1	332	1954	27238-27251	1- 14		109
29	333 1	1955	· · ·	15- 28	2 1	119
30	334	1956	27252-27265	29- 42	3 1	109
1 20	557	1 730	27266-27279	<b>43=</b> 56	4 1	1n9

LS-1

## DEC-1977

,							
	i	GMT	FIIGHT	I SPACECRAFT !	REFERENCE	REF I	CYPLE
	DATE	DAY	DAY	ARBITS	ARBITS	DAY	Ne • I
	1	335	1957	27280-27293	57- 70	5 1	109
	1 5	336	1958	27294-27307	71 - 84	6 1	109
	3	337	1959	2730a-27321	<u> 85- 98 </u>	7	109
	1 4	338	1960	27322-27334	99-111	8	109
	5	339	1961	27335-27348	112-125	9 1	109
	, 6	340	1962	27349-27362	126-139	10	109
	7	341	1963	27363-27376	140-153	11	109
	8	342	1964	27377-27390	154-167	12	1-9
	9	343	1965	27391-27404	168-181	13	109
	10	344	1966	27405-27418	182-195	14 1	109
	11	345	1967	27419-27432	196-209	15	1/9
	12	346	1968	27433-27446	210-223	16	109
	13	347	1 1969	27447-27460	224-237	17	109
	14	348	1 1970	27461-27474	238-251	18	109
	1 15	349	1971	27475-27488	1 - 14	1 1	170
	1 16	350	1 1972	27489-27502	15= 28	l 5 i	110
	17	351	1973	27503-27516	29= 42	3 1	110
	1 18	352	1 1974	27517-27530	43- 56	4 1	110
	1 19	353	1 1975	27531-27544	57- 70	5 1	170
	1 20	354	1 1976.	27545-27558	7i = 84	6 1	110
	1 21	355	1 1977	27559-27572	85= 98	7	1:0
	55	356	1 1978	27573-27585	99-111	1 8 1	110
	23	357	1 1979	27586-27599	112-125	9 1	170
	1 24	358	1980	27630=27613	126-139	1 10 1	110
	25	359	1981	27614-27627	1 40-153	1 11 i	110
	1 26	360	1982	27628=27641	154-167	12 1	110
	27	361	1 1983	1 27642-27655	168-181	131	<u> 170   </u>
	1 28	362	1984	27656-27669	182-195	1 14	110 1
	29	363	1985	27670-27683	196-209	15	1+0
:	30	366	1 1986	1 27684-27697	210-223	1 16 1	110
	31	365	1987	27698-27711	224-237	<u>  17  </u>	<u> 170   </u>

## APPENDIX C

### LANDSAT-1 DOCUMENTS ISSUED THIS REPORT PERIOD

No.	Document No.	Title
1	PIR-14N5-L1-181	Thermal Performance of Landsat-1, dated 9/8/76
2	PIR-14N5-L1-182	MSS Imaging of Earth's Horizon on Landsat-1, dated 5/12/76
3	PIR-14N5-L1-183	Landsat-1 Rear Scanner Failure, dated 5/20/76
4	PIR-1N25-L2-187	Landsat WBVTR Error History,

### TABLE OF CONTENTS

Section									rage
	INTRODUCTION			•	•		•		vii
1	SUMMARY - LANDSAT-2 OPERATIONS	•	• •		•		•		1-1
2	ORBITAL PARAMETERS			•	• **:		•	•	2-1
3	POWER SUBSYSTEM			•	•		•	•	3-1
4	ATTITUDE CONTROL SUBSYSTEM	•		•	•	•	•	•	4-1
5	COMMAND/CLOCK SUBSYSTEM	•		•	•	• •			5-1
6	TELEMETRY SUBSYSTEM	•		•	•	•	• :	•	6-1
7	ORBIT ADJUST SUBSYSTEM	•			•	• •	• 5	•	7-1
8	MAGNETIC MOMENT COMPENSATING ASSEMBLY	• *		•	•		•		8-1
9	UNIFIED S-BAND/PREMODULATION PROCESSOR	•	• • •	•	•	•	•	•	9-1
10	ELECTRICAL INTERFACE SUBSYSTEM	•		. •			•	•	10-1
11	THERMAL SUBSYSTEM						•		11-1
12	NARROWBAND TAPE RECORDERS			•					12-1
13	WIDEBAND TELEMETRY SUBSYSTEM	•	• . •	• 1.12	•	: • •	•		13-1
14	ATTITUDE MEASUREMENT SENSOR	•		•		• •	•	•	14-1
15	WIDEBAND VIDEO TAPE RECORDERS	۰		<i>.</i>	•	• •			15-1
16	RETURN BEAM VIDICON			•		• •			16-1
17	MULTISPECTRAL SCANNER SUBSYSTEM	•	• •	•		•	•	•	17-1
18	DATA COLLECTION SUBSYSTEM	•	:				•		18-1
APPENDIX A -	LANDSAT-2 ANOMALY LIST	•	•. •	•	•				A-1
APPENDIX B -	LANDSAT-2 SPACECRAFT ORBIT REFERENCE TABLES	•	•		•				B-1
A DDENNEY C	LANDSAM & DOGUMENTS ISSUED MINS DEDODE DEDIOD								G 1

### LIST OF ILLUSTRATIONS

Figure							Page
2-1	Effect of Orbit Adjusts and Pitch Position Bias on Landsat-2 Ground Trac						
2-2	Local Mean Time of Descending Node						
2-3	Predicted LMT of Descending Node	•	•	•	•	<u>•</u>	2-5
2-4	Drift in the Angular Phasing Between Landsat-1 and Landsat-2	•	•		•	•	2-7
3-1	Landsat-2 IA (Midday) Degradation vs Days						
3-2	Landsat-2 Midday Solar Array Current	•	•	•	•		$3-3^{\circ}$
3-3	Landsat-2 Actual $\beta$ and $\lambda$ (Paddle) Sun Angles		•				3-4
3-4	Predicted Beta Angles for Landsat-1 and Landsat-2 - 1976 and 1977	•	• : :	•	•	•	3-5
4-1	Landsat-2 Gating Frequency vs Time		• • •	•			4-2
4-2	Landsat-2 Gating History	•	•		•	•	4-3
5-1	Landsat-2 Drift History						5-1
5-2	Cumulative Clock Drift						5-2
5-3	Drift Rate of S/C Clock						
9-1	USB (Link 4) AGC Readings at Goldstone with 30' Antenna, Landsat-2 .					•	9-1
11-1	Landsat-2 Sensory Ring Thermal Profile			•	•		11-3
13-1	WPA-2 (Link 3) AGC Readings at Goldstone with 30' Antenna, Landsat-2	•	•	•		•.	13-2
15-1	Tape Usage Thru Orbit 6380 WBVTR-2	•	•	•	•	•	15-1
16-1	Landsat-2 Real Time Imagery - Camera 1	- 1.					16-4
16-2	Landsat-2 Playback (WBVTR-1) Imagery - Camera 1		•			•	16-5
16-3	Landsat-2 Real Time Imagery - Camera 2						
16-4	Landsat-2 Playback (WBVTR-1) Imagery - Camera 2	•		•	•		16-7
16-5	Landsat-2 Real Time Imagery - Camera 3						16-8
16-6	Landsat-2 Playback (WBVTR-1) Imagery - Camera 3						
17-1	MSS Scenes Image This Quarter	•	•			-	17-3
17-2	MSS Scenes Imaged Since Launch	•	•	•	•	•	17-5
18-1	DCS Message History					٠.	18-2

## LIST OF TABLES

Table		Page
1-1	In-Orbit Payload Systems Performance Launch Thru Orbit 7609 (7/21/76),	
	Landsat-2	1-2
2-1	Landsat-2 Brouwer Mean Orbital Parameters	2-1
3-1	Landsat-2 Major Power Subsystem Parameters	3-7
3-2	Landsat-2 Power Subsystem Analog Telemetry (Average Value for Data	
	Received in NBTR Playback)	3-8
4-1	Landsat-2 Pitch Position Bias Quarterly Pneumatic Gating Summary	
4-2		4-4
4-3		4-5
4-4		4-5
5-1	Command/Clock Telemetry Summary, Landsat-2	5-2
6-1	Landsat-2 TMP Telemetry Values	6-1
_ :		
7-1	Landsat-2 Orbit Adjust Summary	
7-2		7-2
8-1	Landsat-2 MMCA Telemetry Values	8-1
9-1	Landsat-2 USB/PMP Telemetry Values	9-1
10 1	Landsat-2 APU Telemetry Functions	
10-1	Landsat-2 APO Telemetry Functions	10-1
11-1	Landsat-2 Thermal Subsystem Analog Telemetry (Average Value for Frames of	
11-2		11-2 11-4
	医大学性囊膜炎 化二氯甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基	11-4
12-1	NBR Operating Hours by Modes	12-1
12-2		12-1
13-1	Wideband Telemetry Subsystem	13-1
14-1	Landsat-2 AMS Temperature Telemetry	14-1
****	handsat-2 Nuls Temperature referretry.	14-1
15-1	WBVTR Telemetry Values	15-2
15-2		15-3
<b>15-</b> 3		15-4
en en en en en		
16-1	RBV Telemetry Values	16-1
16-2	Camera No. 1 (Blue) Telemetry (Values in TMV)	
16-3		16-2
16-4		16-3
17-1	MSS Telemetry - Landsat-2	17-7
17-2	MSS Response History - Landsat-2	17-8
18-1	DCS Telemetry Values	18-1
LS-2		v/vi

### INTRODUCTION

This is the seventh report in a continuing series of documents issued at launch, and thereafter quarterly, to present flight performance analysis of the Landsat-2 spacecraft. Previously issued documents are:

Document No.	Title	Date
75SDS4214	Landsat-2 Launch and Flight Activation Evaluation Report, 22 to 26 January 1975, Launch through Orbit 50 and Orbit Adjust Operation,	21 March 1975
75SDS4228	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 January 1975 to 23 April 1975.	15 August 1975
75SDS4255	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 April 1975 to 23 July 1975.	10 October 1975
75SDS4266	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 July 1975 to 23 October 1975.	1 December 1975
76SDS4207	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 October 1975 to 23 January 1976.	29 February 1976
76SDS4248	Landsat-1 and Landsat-2 Flight Evaluation Report, 23 January 1976 to 23 April 1976	14 July 1976

This report contains analysis of performance for Orbits 6370 to 7640 for Landsat-2.

#### SECTION 1

#### SUMMARY LANDSAT-2 OPERATIONS

The Landsat-2 spacecraft was launched from the Western Test Range on January 22, 1975, at 022:17:51.604. The launch and orbital injection phase of the space flight were nominal and deployment of the spacecraft followed predictions. All systems continue normal except Forward Scanner Pressure, Forward Scanner Pressure Telemetry, and Wideband Video Tape Recorder No. 1 (WBVTR-1). The Forward Scanner Pressure had begun leaking before launch but will not affect scanner performance. The Forward Scanner Pressure (Function 1003) telemetry became erratic in Orbit 2244 on 2 July 1975.

WBVTR-1 failed to rewind in Orbit 1021, 5 April 1975, and had intermittent operation to Orbit 1659, 21 May 1975, when normal operation was resumed. WBVTR-1 had a new anomaly in Orbit 2683 on 3 August 1975 when ground stations were unable to obtain video sync lockup because of failure of one of the 4 heads. As a result, it cannot be used with MSS data, but with ground hardware modifications it will perform satisfactorily with RBV data because RBV provides a synchronizing pulse which permits data from the bad head to be isolated and prior head data to be substituted. Since Orbit 7181 on 20 June 1976, the recorder has been used regularly in this service recording RBV data.

Spacecraft performance has not been degraded by these anomalies. Table 1-1 shows cumulative in-orbit payload system performance.

Table 1-1. In-Orbit Payload Systems Performance Launch Thru Orbit 7609 (7/21/76), Landsat-2

<del></del>	1-Orbit Payload Systems Performance Launch Thru Orbit 7009 (1/2)	
RBV	Total Scenes Imaged	1673
	Avg. Scenes/Day	15
	Total Area Imaged (millions of sq. mi.)	14.6
	ON TIME (hr)	14.9
	ON/OFF Cycles	137
	Real Time Images	85
-	C Recorded Images	15
MSS	Total Scenes Imaged	89,953
	Avg. Scenes/Day	158
	Total Area Imaged (millions of sq. n. mi.)	784
	ON TIME (hr)	1, 101.0
	ON/OFF Cycles	7, 907
	% Real Time Images	61
	% Recorded Images	39
DCS	Messages at OCC	673,990
	Non-Perfect MSGS	44,073
	Users	<del>4</del> 5
	ON TIME (hr)	12,241
WPA-1	% Real Time Mode	99
	% Playback Mode	1
	ON TIME (hr)	93.4
	ON/OFF Cycles	595
WPA-2	% Real Time Mode	65
	% P/B Mode	35
	ON TIME (hr)	876.9
	ON/OFF Cycles	4,929
WBVTR-1	% Record Mode	38
	% Playback Mode	41
	Rewind Mode	20
	% Standby Mode	1
	Time Head-Tape Contact (hr)	111.2
	Cycles Head-Tape Contact	1,785
	ON TIME (hr)	140.9
WBVTR-2	% Record Mode	38
WDV : IX-2	% Record Mode	
		41
	Rewind Mode	20
	% Standby Mode	1
	MFSE Count in P/B	<10
	Time Head-Tape Contact (hr)	629.3
And the second	Cycles Head-Tape Contact	7,432
	ON TIME (hr)	797.3
<u> مستند تن منت بند منتا</u>	المراجعية الأحراج المحاجج المحاجج المحاجج المحاجج المحاجج المحاجج المحاجج المحاجج المحاجج المحاجج المحاجج المحاج	<del></del>

#### SECTION 2

#### ORBITAL PARAMETERS

Landsat-2, together with Landsat-1, has continued to provide the ground track repeat pattern required for the nine-day image coverage of the earth. During this report period, the ground track of Landsat-2 has been maintained within 3 NM longitude error at the equator. This has been done by controlling the ACS pitch gates through the use of pitch position bias mode. (See Section 4 also). Therefore, no orbit maintenance burn of the OAS was required during the current report period.

The error in longitude since launch as a function of time and orbit maintenance burns is shown in Figure 2-1. Figure 2-2 shows the change in sun time at the descending equatorial crossings.

As of 22 July 1976, Landsat-2 has descending equatorial crossings at approximately 9:24 AM local time as opposed to 8:54 AM for Landsat-1. A projection of the variation of local mean time at the descending nodes for both spacecrafts is given in Figure 2-3.

The difference in the orbital periods of Landsat-1 and Landsat-2 has been causing a drift in the angular phasing between the two satellites. At the end of this report period, the two spacecrafts are separated in their orbits by an angle of 77.6° in plane, Landsat-2 leading Landsat-1 GMT by 22.2 GMT minutes. Figure 2-4 is an approximation of the pattern of this drift since the beginning of Landsat-2 mission.

The Brouwer Mean Orbital Parameters for Landsat-2 are given in Table 2-1. Appendix B gives ground trace repeat cycle preditions.

Table 2-1. Landsat-2 Brouwer Mean Orbital Parameters

Element	Apogee (KM)	Perigee (KM)	Inclination (Deg.)	Semi-Major Axis (KM)	Eccentricity	Two Body Period (Min)	Nodat Period (Min)	Argument of Perigee (Deg)	Right Ascension (Deg)	Mean Anomaly (Deg)
25 Jan 1975 <sup>1</sup>	915, 03	901, 56	99, 095	7286, 462	0, 000925	103, 165	-	272, 852	86.637	139, 578
6 Feb 1975 <sup>2</sup>	916, 81	898, 17	99, 096	7285, 820	0. 001260	103, 151	-	256, 010	99, 317	131, 523
24 Apr 1975	917, 85	897, 40	99, 079	7285, 788	0,001103	103, 151	103, 266	62, 55	174, 339	117, 183
25 July 1975	917.45	897, 68	99, 071	7295, 730	0.001356	103, 150	103, 265	166, 115	264, 891	13,726
20 Oct 1975	916.70	898, 49	99. 059	7285, 762	0,001250	103, 150	103, 266	382, 749	353, 366	257, 271
24 Jan 19, 6	917,36	897.81	99,616	7285,781	0.001342	162,150	103,266	31,621	51,554	144, 179
23 Apr 1976	917.67	597.41	99.029	7285.721	0.001389	103,149	103,265	139,745	172.774	40,033
22 July 76	916, 62	895,40	99, 621	7285,677	0,001251	103, 148	103, 364	255,961	260,924	286,654

<sup>1</sup> Post launch

<sup>2</sup> After the sequence of phasing maneuvers completed in Orbit 212

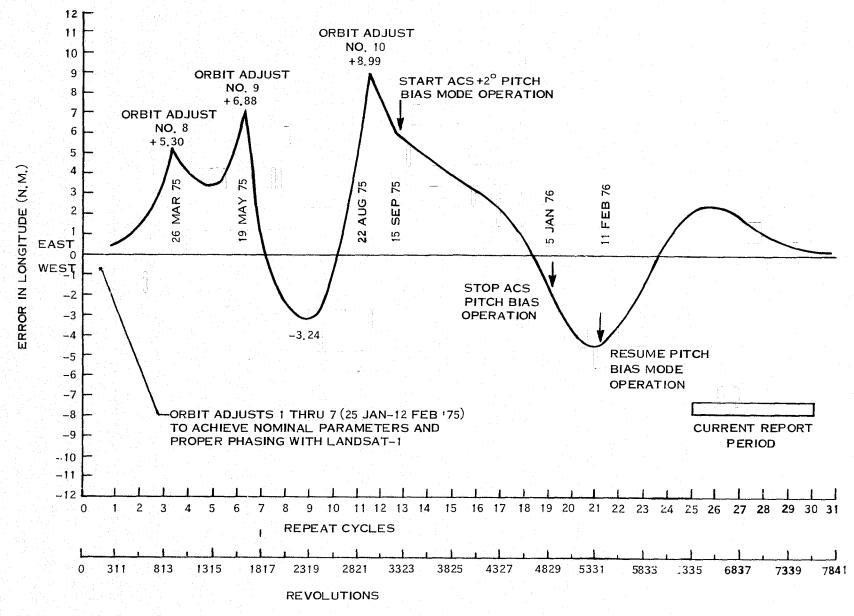


Figure 2-1. Effect of Orbit Adjusts and Pitch Position Bias on Landsat-2 Ground Track

LS-2

man FF

.

-----

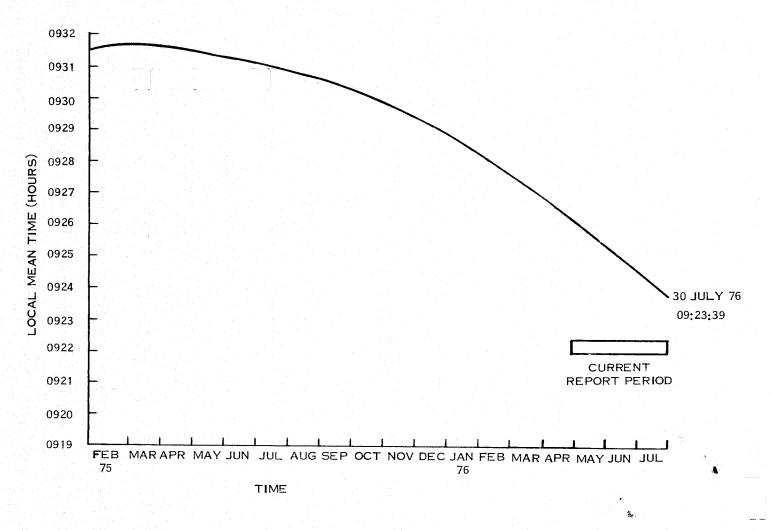
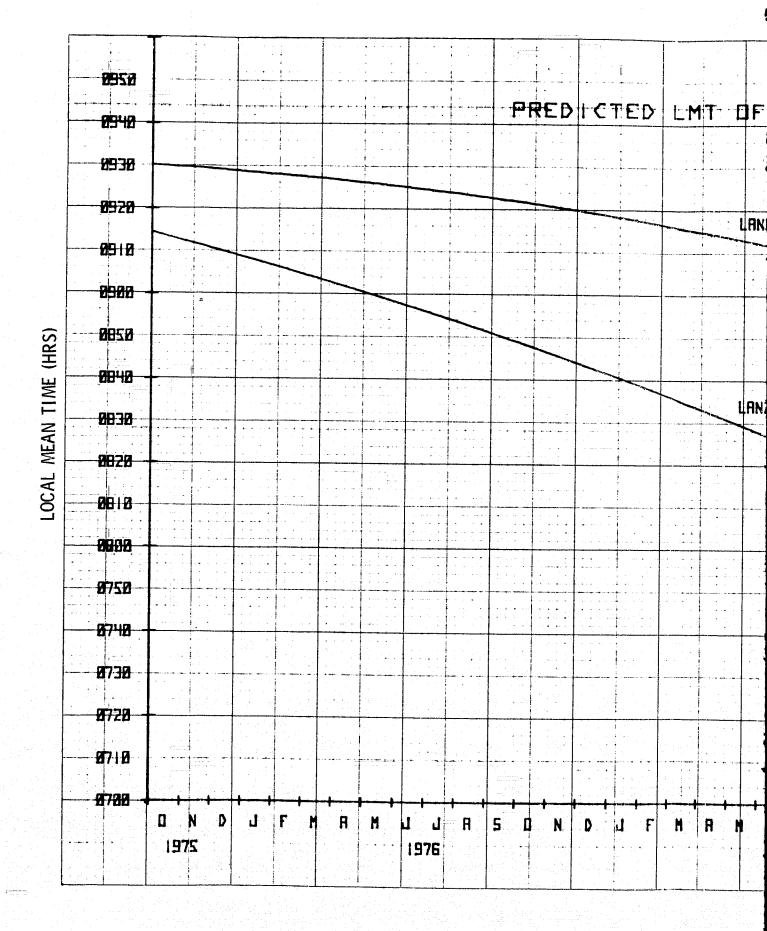


Figure 2-2. Local Mean Time of Descending Node

2-3/



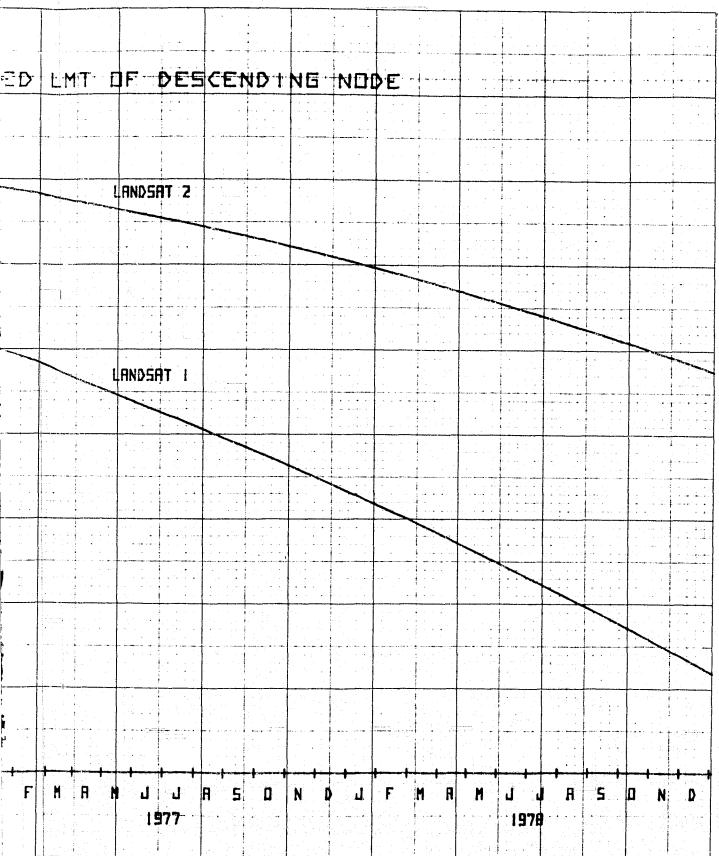


Figure 2-3. Predicted LMT of Descending Node

LS-2

2-5/6

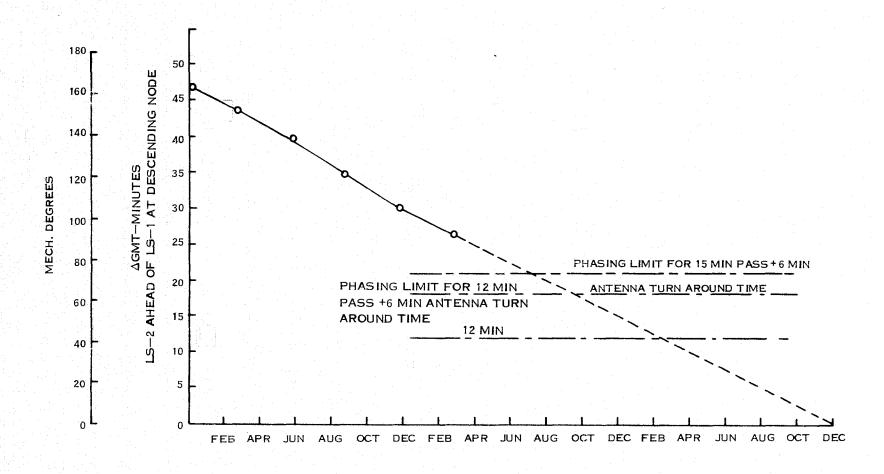


Figure 2-4. Drift in the Angular Phasing Between Landsat-1 and Landsat-2

#### SECTION 3

#### POWER SUBSYSTEM (PWR)

The Power Subsystem on Landsat-2 has performed satisfactorily throughout this report period.

The solar arrays continued to provide excess energy above spacecraft and payload requirements and are expected to support the Landsat-2 mission beyond 1976. The percentage degradation of the arrays is plotted as a function of days in orbit in Figure 3-1, along with the pre-launch predicted array degradation. The array degradation at the end of eighteen months in Orbit is 11.75%, which is slightly higher than predicted. The projected values of midday array current are plotted in Figure 3-2. Here the array current is adjusted for sun intensity and array degradation, as well as sun angle. Along with the same curve is plotted the actual telemetry values observed until the end of the current report period.

During Orbits 6451 and 6453 on 29 April 1976, Landsat-2 passed through the annular solar eclipse over the northern hemisphere. The loss in array energy was compensated by real-time adjustments to the auxiliary and compensation loads.

The battery packs averaged a typical 9 to 10% depth of discharge (DOD) during this report period. The charge and discharge characteristics of battery 6 became more unstable towards the end of this report period leading to high charge/discharge ratios and temperatures. Therefore, in Orbit 7601 (20 July 1976) the battery was taken off line for a restoration cycle similar to those done for battery 6 on Landsat-1. The battery is scheduled to be turned on when it discharges to about 26.5 volts through its small telemetry load. The charge and discharge characteristics of other batteries remained satisfactory although battery 1 assumed higher charge and lower discharge shares than others (see Table 3-1). The temperature spread between batteries ranged from 5.5 to 8.2°C, the higher spread being mainly one to battery 6 temperature. Since turn-off of battery 6, the temperature spread has decreased to about 5°C. Battery voltages have been maintained within suitable limits with Landsat-2 power management procedures, excess array energy being dissipated through auxiliary loads.

The power subsystem electronics have performed extremely well during this report period with all regulated voltages stable. Table 3-1 shows major subsystem parameters and Table 3-2 shows power subsystem telemetry for selected orbits. Some parameters in Table 3-1 may be slightly different from those in Table 3-2 because Table 3-1 uses a power management time span (night followed by day), whereas the time span used in Table 3-2 is the playback period from the NBR.

The shunt limiter on Landsat-2 has operated several times since launch and has held the solar array bus voltage at specified levels.

Figure 3-3 shows the actual variation in sun angle to orbit plane and solar panels for Landsat-2. Figure 3-4 is a prediction of the variations of the sun angle through 1977 for Landsat-1 and 2.

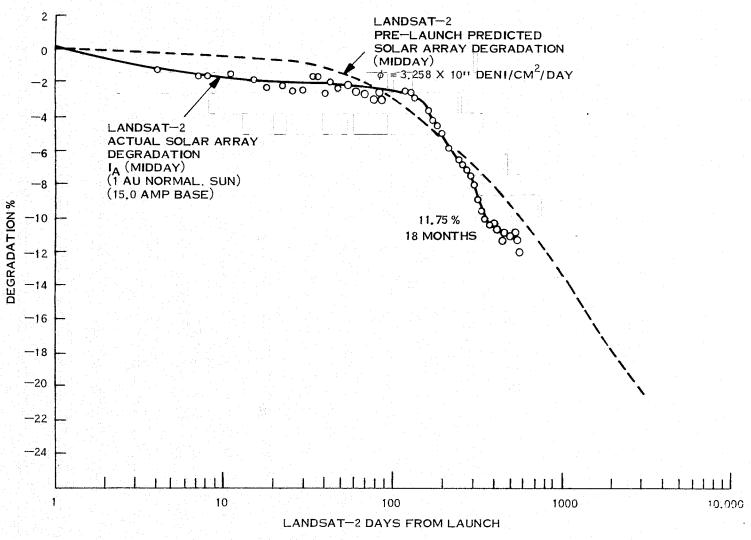


Figure 3-1. Landsat-2  $I_A$  (Midday) Degradation vs. Days

LS-2

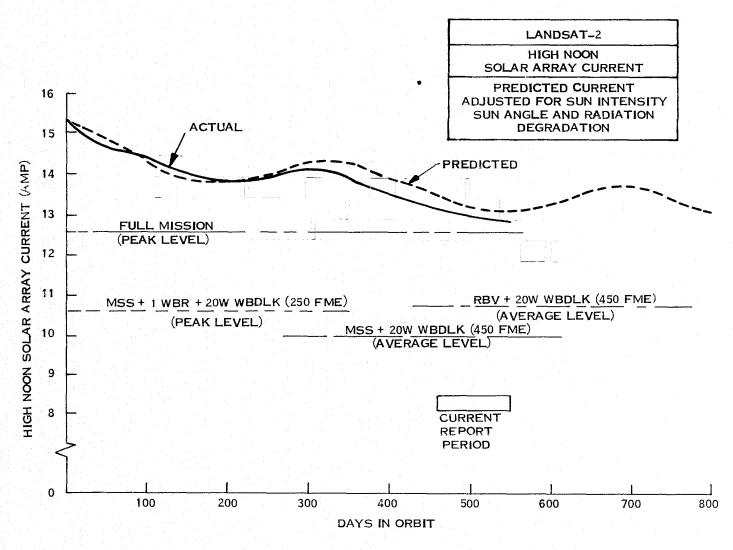


Figure 3-2. Landsat-2 Midday Solar Array Current

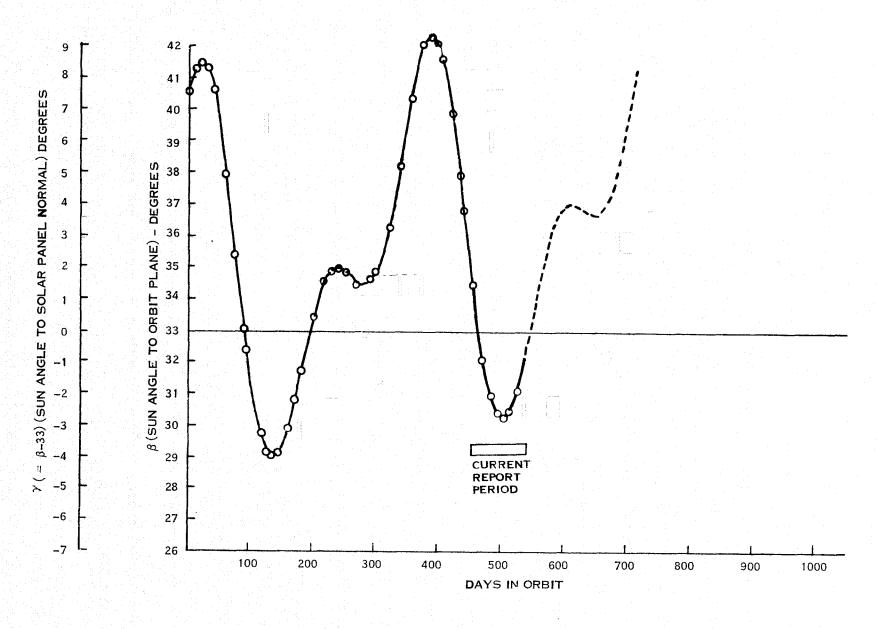
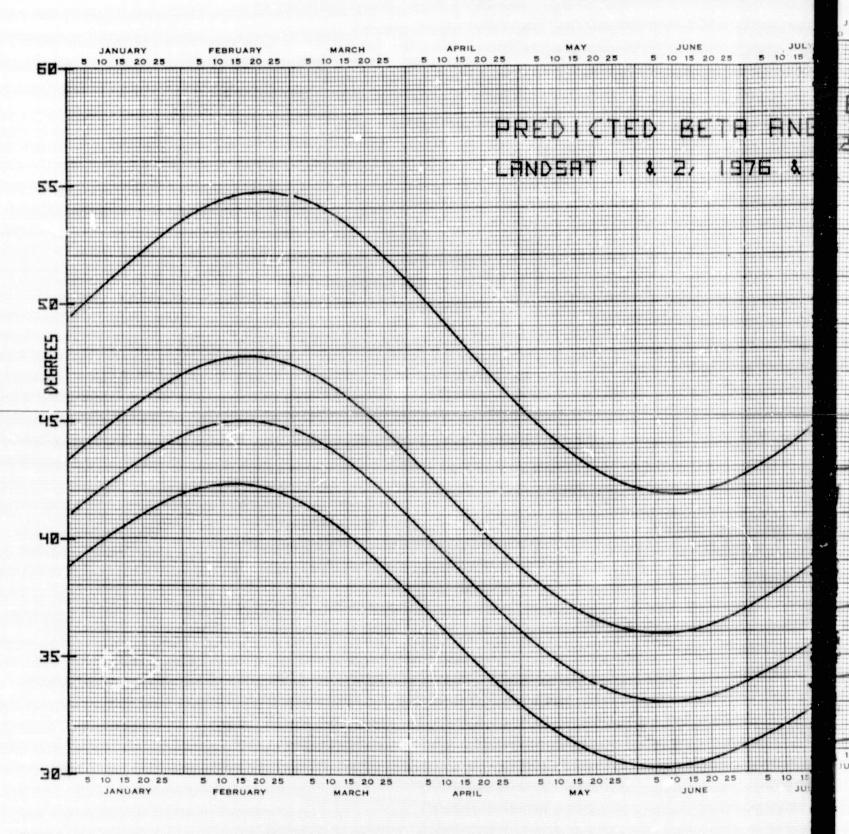


Figure 3–3. Landsat–2 Actual  $\beta$  and  $\gamma$  (Paddle) Sun Angles



FOLDOUT FRAME

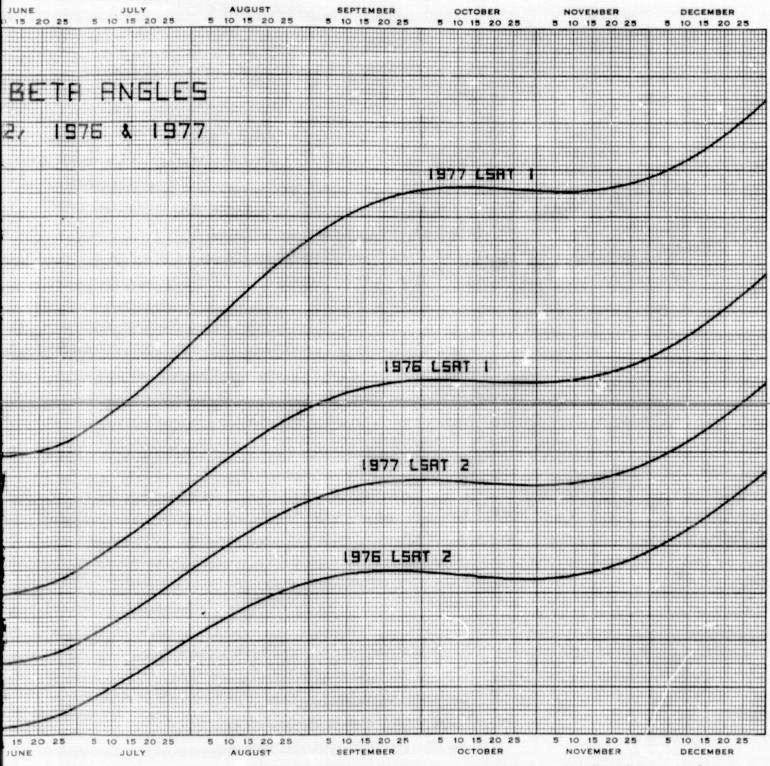


Figure 3-4. Predicted Beta Angles for Landsat-1 and Landsat-2 - 1976 and 1977

Table 3-1. Landsat-2 Major Power Subsystem Parameters

Pwr. I	Mgmt, Orbit No.	50	2540	5100	6362	6791	7180	7640
Batt 1	l Max	33,43	33.25	32,66	32.91	32.74	32.91	33,08
2	2 Chge	33.40	33.14	32,63	32.80	32,71	32,80	33.05
	3 Volts	33.35	33.09	32.57	32.75	32,66	32.83	33,09
		33.45	33.20	32,68	32.85	32,68	32.85	33, 20
	5	33,42	33.25	32.65	32.82	32.73	32,91	33.08
ě	i i	33,41	33.24	32.64	32.82	32,56	32.82	28.79
	7	33.45	33.28	32.68	32.93	32.76	32.93	33,11
	8	33, 45	33,27	32,68	32.93	32,76	32.93	33.10
Avera		33,42	33.21	32,65	32.85	32.70	32.87	33.10
	1 End-of-Night	29,32	29.06	29.06	28.89	28, 80	28.89	29.06
	2 Volts	29,38	29,12	29.04	28.87	28.87	28.87	29.12
	3	29.32	29.07	29.07	28.89	28.81	28.89	29.07
	4		29.09	29.09	28.91	28, 83	28,91	29,09
		29.34			28.89	28, 89	28.89	29.06
	5	29.40	29.06	29.06			28.88	28,71
	6	29.31	28.96	28.96	28.88	28.79		I
	7	29.34	29.08	29.08	28.91	28, 82	28.91	29.00
	8	29.34	29.00	29.00	28.82	28,82	28, 82	29.00
Averag		29.34	29.05	29.04	28.88	28,83	28.88	29.06
Batt :	1 Chge	12.76	12.13	12.43	13.22	12.44	12.61	15.51
2	2 Share	11.68	12.45	11.42	12.15	12.42	12,08	13.54
	3 (%)	12.24	13.67	12.48	13.04	12,91	13.13	14.13
	4	11.99	12.50	11.76	12.19	12.06	12.35	13, 97
	5	12.84	11.52	13,24	12.07	11.88	12.02	14.32
	6	13,35	13,20	14.32	13.90	15.52	14.41	-
	7	12.90	12.81	12.97	12.36	12.03	12.34	14.30
	8	12.24	11.72	11.38	11.05	10.74	11.06	13, 14
	1 Lord	12.60	11.35	11.80	10.87	10.97	11.48	12.84
	2 Share	12.70	13,99	13.34	14.40	14,63	13, 95	15.60
			14.38	13.74	14.54	14.67	14.13	15, 41
	3 (%)	12.67			13.17	13.42	13, 37	14.71
	4	12.44	12.99	12.48	12.02	12.20	12.25	13.69
	5,	12.34	11.58	12.36			10.29	10.00
	6 '	12.70	11.30	11.56	10.42	9,22	1	14,03
	7	12.47	12.35	12.70	12.66	12, 83	12,50 12,03	11.79
	8	12.04	12,06	12.02	11.91	12.06		
Batt -	l Temp	21.46	21.34	21.94	22.03	21.06	20.26	21,47
	2 in	20,25	21,44	19.94	20.46	20.76	19.57	19.90
	3 (°C)	18.60	19.18	17.86	18.05	18.09	17.38	17.79
	4	20.83	20.91	20.36	20.20	20.21	20.14	20.37
	5	24.98	22.31	27,27	23.04	22.35	21,87	22.64
	6	24,26	23.01	27.28	24.38	24.71	23.10	20.49
	7	24,71	23.62	26,32	24.10	22,74	22.03	22,90
	8	23.63	22.71	24.41	23.01	21.80	21.37	22.40
Avera		22.34	21.81	23.17	21.91	21.47	20.72	21.00
	eg Bus Pwr. (W)	*	185.0	149.3	164.57	167.03	149.81	146.12
	Load Pwr. (W)	*	41.2	24.8	24.8	17.64	17.64	17.64
	Reg Bus Pwr. (W)	*	9.6	9.8	9.59	9.84	10.82	11,81
C/D F		1.15	1.10	1,11	1.23	1.25	1.21	1.15
	Charge (A-M)	271.9	267,55	223,46	256.44	262.53	259.02	239.11
	Discharge (A-M)	237, 2	244.33	201.45	208.58	209.30	213.84	207.47
	Array (A-M)	1106	981	1003	933	903	887	892
			14.67	14.43	13.96	13.49	13.49	13.41
	Peak I (Amp)	16.05	1		13.25	13.10	12.94	12.78
	y Array I (Amp)	*	13.88	13.72	1.2	-2.2	-2.4	0.3
	ngle (Deg)	*	-1.22	8.35			58.40	58.40
	Pad Temp (OC)	*	59.60	63,20	59.60	58.40		1
	Pad Temp ( <sup>o</sup> C)	*	-38.00	-35.00	-36.20	-38.00	-38,67	-38.00
	L Pad Temp (OC)	*	56.92	62.15	57.69	56.92	57.69	56, 92
	Pad Temp (OC)	*	-45.00	-42.14	-43.57	-45.71	-46.43	-45.71

<sup>\*</sup> Data not processed and unavailable \*\*Bat 6 was turned off in orbit 7601 for a restoration cycle +Average of batteries on line

Table 3-2. Landsat-2 Power Subsystem Analog Telemetry (Average Value for Data Received in NBTR Playback)

<b></b>						Orbits			
Function	Description	Unit	50	2532	5102	6362	6761	7210	7641
6001	Batt 1 Disc I	Amp	1.01	0.85	0.74	0.62	0.74	0.72	0,85
6002	2	· ·	1.01	0.97	0.84	0.82	0, 91	0.88	1.02
6003	3		1.00	0.99	0.87	0.82	0.93	0.89	1.01
6004	4		1.00	0.93	0.78	0.74	0.88	0.84	0.97
6005	5		0.99	0.85	0.78	0.68	0.81	0.77	0.91
6006*	6	]	1.02	0.86	0.73	0.60	0.64	0,63	0.00
6007	7	]	1.00	0.91	0.80	0.70	0.81	0, 81	0.92
8008	8		0.97	0.87	0.75	0.67	0.77	0.75	0.90
3011	Batt 1 Chg I	Amp	0.47	0.57	0.42	0.51	0.47	0,50	0.52
012	2		0.43	0.57	0.38	0.47	0.45	0.50	0.46
013	3	-	0.45	0.61	0.42	0.50	0.49	0, 53	0.48
014	4		0.44	0.57	0.39	0.47	0.45	0.49	0.47
015	5		0.47	0.54	0.44	0.46	0.46	0.48	0.48
016*	6	ĺ	0.49	0.60	0.47	0.53	0.58	0.57	0,00
017	7	ļ	0.47	0.60	0.43	0.48	0.46	0.50	0.48
018	8		0.45	0.55		0.43	0.41	0.44	0.44
021	Batt 1 Volt	VDC			0.38		1	l .	
021 022	Batt 1 Volt	VDC	31.50	30.92	31.11	30,99	31.00	30.93	31,42
		1	31.48	30.90	31.09	31.98	30.99	30.92	31.41
023	3		31,49	30.91	31.10	31.00	31.01	30.94	31,43
024	4		31,49	30.91	31.10	31.00	31.01	30. 94	31,43
025	5		31.50	30.92	31.11	31.00	31.01	30, 94	31.43
026*	6		31.49	30.90	31.08	30.97	30, 96	30, 89	28.69
027	7	Ī.	31,52	30.94	31,14	31.03	31.04	30.96	31.46
028	8		31.49	30.92	31.11	31.01	31.01	30.94	31.43
031	Batt 1 Temp	DGC	21.59	20.93	21,91	22,05	20, 81	20.68	21,45
132	2		20,53	20.75	19.90	20.46	20.09	20, 31	19.86
033	3		18.80	18.66	17.77	18.04	17,72	17.76	17.43
34	4		20.90	20.88	20.33	20.21	20.23	20.14	20.34
035	5		25.16	22,22	27.18	23.04	22.40	21.96	22.62
036	6		24.37	22,55	27.19	24.41	24.39	23, 76	20, 12
037	7		24.83	23.26	26.19	24.08	22,40	22.44	22,89
038	8		23.75	22.52	24.36	23.01	21.74	21.65	22, 36
040	Rt. Pad Temp	DGC	28.96	26.16		26.98	24,69	24. 31	25, 34
041	Rt. Pad VM	VDC			30.90	33.34	33.57	33, 47	34.00
042			33.72	33.56	32.86	32.88	33.34	33.47	33,45
	Rt. Pad VN	VDC	33.46	33,18	32.44	1	20, 97	20.51	22:53
044	Lt. Pad 1emp	DGC	25.56	21.16	28,22	25.47	33, 84		
045	Lt. Pad VF	VDC	34.40	33.80	33.82	33.80		33.77	34,39
046	Lt. Pad VG	VDC	34.48	33.91	33.91	33.87	33.92	33.84	34.48
050	S/C UR Bus V	VDC	31.73	31.14	31.33	31.19	31.24	31. 14	31,69
051	S/C RG Bus V	VDC	24.57	24.57	24.58	24.58	24.58	24.57	24,58
)52	Aux Reg AV	VDC .	23.36	23,40	23.44	23.44	23, 42	23.43	23, 43
)53	Aux Reg BV	VDC	23.37	23,39	23,44	23.43	23, 41	23.40	23.44
054	Solar I	Amp	14.81	13.76	13.40	12.85	12.63	12, 43	12, 37
056	S/C RG Bus I	Amp	7.23	7.17	6.28	6.67	6.43	6.80	5.98
068	PC Mod T1	DGC	21.67	21.98	20.77	21.46	21.12	21.58	20,49
)59	PC Mod T2	DGC	20.44	20.53	19.56	19.81	19.69	19.78	19.39
70	P/L RG Bus V	VDC	24.61	24.60	24.60	24.60	24.60	24.60	24,62
)71	P/L UR Bus V	VDC	31.85	31,21	31.40	31.25	31.31	31, 20	31.79
73	P Aux AV	VDC	23,47	23,51	23.51	23.50	23.50	23, 51	23.50
74	P Aux BV	VDC	23.46	23.51	23,51	23.50	23.51	23, 51	23.50
75	PR Mod T1	DGC	20.84	21.39	20.32	20.76	20.74	21.07	20,21
76	PR Mod T2	DGC	22.13	22.38	21.79	22.12	22.03	22.24	21.72
79	Fuse Blow V	VDC	24,48	24.48	24.49	24.48	24.47	24.47	24.51
80	Shunt 1 I	Amp	0.0	0.0	0.00	Ú. 00	0.00	0.00	0.00
81	2		0.0	0.0	0.00	0.00	0.00	0.00	0.00
82	3		0.0	0.0	0.00	0.00	0.00	0.00	0.00
183	4		1			0.00	0.00	0.00	0.00
	5		0.0	0.0	0.00	0.00	0,00		
084			0.0	0.0	0.00			0.00	0.00
)85 100	6		0.0	0.0	0.00	0.00	0.00	0.00	0,00
086	7		0.0	0.0	0.00	0.00	0,00	0.00	0,00
087	8		0.0	0.0	0.00	0.00	0.00	0.00	0.00
100	P/L RG Bus I	Amp	0.38	0.80	0.54	0.39	0.46	0.53	0.43
otal No.	Major Frames	Frm	396	387	785	384	785	785	788

<sup>\*</sup>Battery 6 was turned off in orbit 7601 for a restoration cycle

#### ATTITUDE CONTROL SUBSYSTEM (ACS)

Landsat-2's Attitude Control System performed normally since launch and has consistently maintained correct spacecraft attitude.

Low pressure in the Forward Scanner resulting from a pre-launch leak has had no effect on the ACS Subsystem's performance.

The program implemented in September 1975 to minimize spacecraft ground track drift by controlling Pitch gating was continued during this quarter. Table 4-1 summarizes the Pitch Position Bias mode sequences implemented this quarter as part of this program, and Figure 2-1 in Section 2 shows the effects of Pitch gating control on the spacecraft's orbital ground track drift.

As a result of the ground track drift maintenance program, Freon Uscable Impulse declined at a lower rate as shown in Figures 4-1 and 4-2.

RMP2 commanded into operation shortly after ACS acquisition as the primary control of the Yaw subsystem has functioned normally.

Both Solar Array Drives (SAD) performed normally and maintained proper solar panel alignment with the sun line during satellite day. Motor voltages and temperatures are within specifications.

Typically, flywheel duty cycles have averaged seven percent of less. Pitch and Yaw flywheel speeds have averaged less than -150 RPM while the Roll Flywheels have averaged +760 RPM. Sun transient response due to dual scanner mode operation has been normal.

Tables 4-2, 4-3 and 4-4 show typical telemetry for temperatures and pressures; voltages and currents and attitude errors and driver duty cycles as obtained from SCEST program averages.

Table 4-1. Landsat-2 Pitch Position Bias Quarterly Pneumatic Gating Summary

Period			olementation ence			
		0	rbit Number		Duration Centered About Satellite	Resulting Average Number of Pitch
From Orbits	To Orbits	No	No+1	No+2	Midnight (Minutes)	Gates per Day
6040 (30 Mar 76)	6433 (28 Apr 76)	+2.9°	+2, 9 <sup>0</sup>	+2,90	50	5 to 7 (~P)
6433 (28 Apr 76)	6447 (29 Apr 76)	+2.0°	+2.00	+2.0°	50	0
6447 (29 Apr 76)	6837 (27 May 76)	+2,0°	+2.90	+2.00	50	4 to 5 (-P)
6837 (27 May 76)	6862 (28 May 76)	+2.00	+2.0°	+2.00	50	0 to 1 (-P)
6862 (28 May 76)	6934 (2 June 76)	+2.00	+2.00	+2.00	40	3 to 5 (+ P)
6934 (2 June 76)	7102 (15 June 76)	+2.00	+2,00	+2.00	45	1 to 2 (+ P)
7102 (15 June 76)	7214 (23 June 76)	+2.00	+2.00	+2.00	40	D to 4 (+ P)
7214 (23 June 76)	7251 (25 June 76)	+5.00	+2.00	+2,00	18 18 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 (+ P)
7251 (25 June 76)	7409 (7 July 76)	+2.0°	+2, nº	+2,00	50	a
7409 (7 July 76)	7640 (23 July 76)	+2.0°	+2.90	+2.00	50	2 (-P)

LS-2

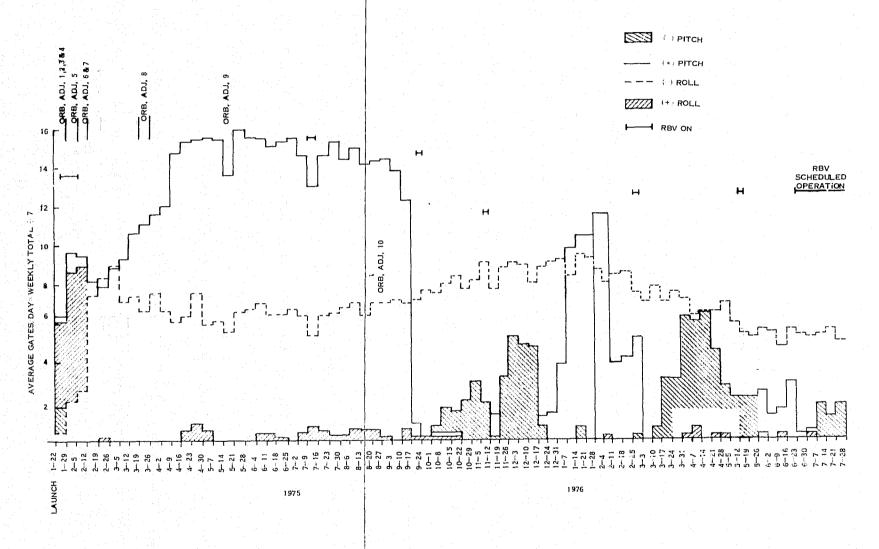


Figure 4-1. Landsat-2 Gating Frequency vs Time

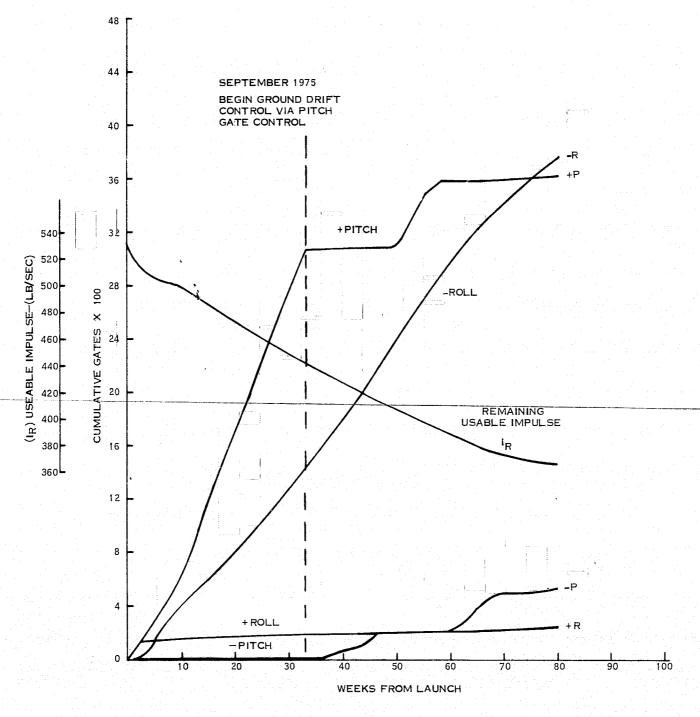


Figure 4-2. Landsat-2 Gating History

						Orbits			
Function	Units		29	2532	5102	<b>63</b> 62	6761	7210	7641
1084 RMP 1 Gyro Temperature	DGC	1	19.33(1)	21.02	22.69	22.71	22.75	22.69	22.45
1094 RMP 2 Gyro Temperature	DGC	ļ	74.00	74.00	74.26	74.34	74.39 -	74.39	74.45
1222 SAD RT MTR HSNG Temp.	DGC		19.50	22.23	22.98	<b>23.</b> 88	24.24	23, 96	23, 62
1242 SAD LT MTR HSNG Temp.	DGC		26.87	27.54	29.79	29.36	29, 26	28.96	28.94
1223 SAD RT MTR WNDNG Temp.	DGC		21.76	24, 23	<b>24.3</b> 6	25.62	26.20	25.84	25.23
1243 SAD LT MTR WNDNG Temp.	DGC		30.23	30.32	32.83	32, 10	31,97	31,71	31.68
1228 SAD RT HSG Pressure	PSI		7.26	7,25	7.18	7.13	7.13	7.13	7.13
1248 SAD LT HSG Pressure	PSI		7.28	7.27	7.21	7.15	7.11	7.04	7.02
1007 FWD Scanner MTR Temp.	DGC		22.07	22, 25	23.80	23.94	23.73	23.49	23.39
1016 Rear Scanner MTR Temp.	.DGC		24.19	23.62	25.04	24.75	24.85	24.73	24.59
1003 FWD Scanner Pressure	PSI		9.59(2)	D	D	D	D	D	D
1012 Rear Scanner Pressure	PSI		6.21	6.00	5.62	5,46	<b>5.</b> 46	5. 36	5 <b>.</b> 35
1212 Gas Tank Pressure	PSI		1948.0	<b>167</b> 2. 12	1517.04	<b>143</b> 2.58	1430.44	1405.77	1381.12
1210 Gas Tank Temperature	DGC		20.66	22.33	24.25	24.01	24.07	23.99	23,75
1213 Manifold Pressure	PSI		53.98	54.83	54,56	55.00	54.82	55.44	54.78
1211 Manifold Temperature	DGC		19.18	20.50	22.59	22.41	22,41	22.07	21.91
1059 CLG Power Supply Card Temp	DGC		39.00	39.52	41.47	41.19	41.02	40.72	40.71
1260 TH01 EBP	DGC		24.29	25.01	27.21	26.76	26.65	26.37	26.43
1261 TH02 EBP	DGC		20.29	21.36	23.25	23.14	23,06	22.77	22.79
1262 TH03 EBP	DGC		18.29	20, 05	21.46	21.59	21.78	21.48	21.34
1263 TH01 STS	DGC		6.54	-6.22	0.52	-2.58	-3.09	-3.83	-2,62
1264 TH02 STS	DGC		D	D	D	D	D	D	D
1265 TH03 STS	DGC		8.46	48	8.67	5.49	4.17	3, 31	5.75
1266 TH04 STS	DGC		-2.78	-9.65	<b>-3.</b> 26	-4.21	-4.32	-4.97	-3.63
1267 TH05 STS	DGC		9.62	-2.64	5.57	1.97	1.19	.06	2.20
1224 SAD R FSST	DGC		35.00	36,57	35.81	39.80	42,48	42.72	40,86
1244 SAD L FSST	DGC		50.00	46.29	49.13	48.65	51.77	51.43	51.71

<sup>(1)</sup> RMP-1 Left off after initial test in Orbit 1
(2) Prelaunch leak - refer to text
D Defective telemetry point

Table 4-3. Landsat-2 ACS Voltages and Currents

					Orbit			
Function	Units	29	2532	5102	6362	6761	7210	7611
1081 RMP 1 MTR Volts	VDC	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1082 RMP 1 MTR Current	Amps	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1080 RMP 1 Supply Volts	VDC	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1091 RMP 2 MTR Volts	V'DC	29, 99	29.94	29.92	29.87	29.87	29.87	29, 87
1092 RMP 2 MTR Current	Amps	0,10	0.10	0.10	0.10	0.10	,11	.11
1090 RMP 2 Supply Volts	VDC	-23,63	-23,61	-23.59	-23.59	-23.59	-23,58	-20, 59
1220 SAD RT MTR WNDNG Vol	ts VDC	-5.47	-4.51	-4.47	-4.37	-4.34	-4.26	-4.22
1240 SAD LT MTR WNDNG Vol	ts VDC	-5, 08	-4.70	<b>-4.</b> 72	-4.66	-4.54	-4.61	-1.54
1227 SAD RT -15 VDC Conv	VDC	15, 14	15, 15	15.16	15, 13	15.13	15, 13	15, 13
1247 SAD LT -15 VDC Conv	, VDC	15, 23	<b>15</b> , 22	15.21	15.21	15.21	15, 22	15.20
1056 CLB ± 6 VDC	TMV	2.35	2,35	2.38	2,38	2.38	2.38	2,38
1055 CLB ± 10 VDC	TMV	2.88	2.90	2.92	2.92	2.93	2.93	2, 93
1057 CLB Power Supply Volts	TMV	2.97	2,94	2.96	2.96	2.96	2,97	2,96

Table 4-4. Landsat-2 ACS Attitude Errors and Driver Duty Cycles

					Orbits			
Function	Units	26	2532	5102	6362	6761	7210	7641
1041 Pitch Fine Error	DEG	-0, 15	-0.14	13	-1.99	-1,52	-1, 12	-1, 18
1043 Pitch Flywheel Speed	RPM	-156, 12	-198.41	-162.97	202.41	212.68	-146,25	214.14
1038 Pitch Mtr Drvr CCW	PCT	6.64	7,35	6.05	4,21	4,21	7, 88	1,21
1039 Pitch Mir Drvi CW	-PCT-	2,03	2.60	1.80	8, 17	8, 52	1.11	8.51
1030 Roll Fine Error	DEG	-0, 13	-0.09	14	-, 13	14	16	14
1027 Roll Rear Flywheel SPD	RPM	729, 30	739.75	748,56	745.59	748,60	742.91	742,88
1026 Roll Fwd Flywheel SPD	RPM	703, 02	725, 23	735.81	723.65	730, 26	708, 57	721,03
1022 Roll Rear Mtr Drvr CCW	PCT	0, 67	.39	. 63	47	. 15	. 32	. 11
1025 Roll Rear Mtr Drvr CW	PCT	7.54	5.47	6.34	5.36	5.80	6.68	6.80
1023 Roll Fwd Mtr Drvr CCW	PCT	0,70	.37	, 87	. 55	. 62	. 55	. 68
1024 Roll Fwd Mtr Drvr CW	PCT'	5, 46	4.74	4.01	4.60	3, 57	4.28	3, 82
1035 Yaw Tach	RPM	-95, 73	-41,57	-38.16	-103.44	-55, 73	-86.84	-11,08
1033 Yaw Mtr Drvr CW	PCT	1, 98	1,77	2.01	1.67	1.78	1.57	1.76
1034 Yaw Mtr Drvr CCW	PCT	2, 10	1.72	1.90	1.74	1.89	1.81	1,64
1221 SAD Right Tach	D/M	0.00	3,38	3.38	3.37	3, 38	3, 37	3, 38
1241 SAD Left Tach	D/M	3.68	3,63	3.56	3,56	3, 56	3, 57	3, 55

# SECTION 5 COMMAND/CLOCK SUBSYSTEM (CMD)

The CMD Subsystem operated nominally in this report period.

Figure 5-1 shows the history of the S/C clock drift since launch. Figure 5-2 shows the cumulative clock drift, 6.5 seconds in 18 months, and Figure 5-3 gives drift rate of the S/C clock, an average of 0.82 MS/orbit. The clock of Landsat-2 drifts in opposite direction from the clock of Landsat-1.

Table 5-1 shows typical telemetry values since launch. All are nominal.

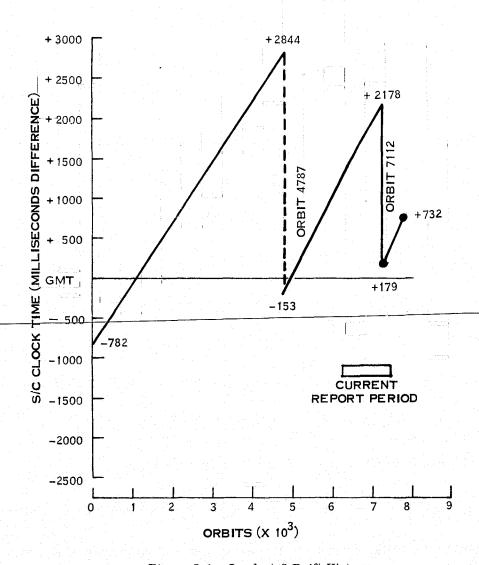


Figure 5-1. Landsat-2 Drift History

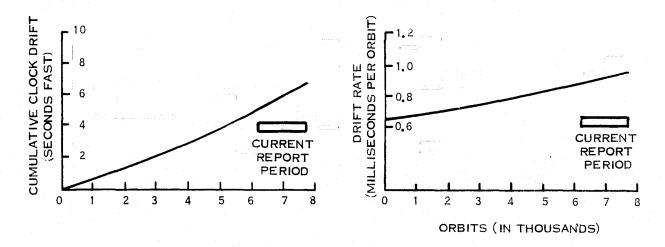


Figure 5-2. Cumulative Clock Drift

Figure 5-3. Drift Rate of S/C Clock

Table 5-1. Command/Clock Telemetry Summary, Landsat-2

		·								
Function							Orbit	<u> </u>	<u> </u>	
No.	Name	Mode	Units	35	2462	5091	6362	6761	7210	7641
8005	Pri. Power Supply Temp	-	DGC	38, 82	40,43	39,43	39.60	40, 18	40,06	39,94
8006	Red. Power Supply Temp	_	DGC	36, 93	38,70	38.00	38,31	38, 83	38, 66	38.52
8007	Pri. Osc. Temp	_	DGC	28,70	29, 35	28.70	28,70	28,70	28,70	28,69
8008	Red Osc, Temp		DGC	27, 82	28,68	27.26	27,33	27, 87	27,77	27.69
8009	Pri. Osc. Output		TMV	1,06	1,06	1.05	1,05	1,06	1,06	1.0
8010	Red, Osc. Output		TMN	1, 17	1, 20	1,18	1,19	1, 19	1, 19	1.1
8011	100 KHz	Pri Red	TMV	3, 17	3, 16	3, 15	3.15	3, 15	3, 15	3, 1
8012	10 KHz	Pri Red	TMV	3, 08	3, 05	3.05	3.05	3, 05	0, 05	0.0
		Pri Red	TMV	3.01	2,95	2.95	2,95	2,95	2, 95	2.9
8013	2, 5 KHz	Pri Red	TMV	4, 17	4.45	4.45	4.45	4,45	4, 15	1.1
8014	400 Hz		VDC	NA	2,05	2.05	2,05	2,05	2, 05	2,0
8015 -	Pri, +4V Power Supply	Pri, Clk ON			2,01	2.00	2.00	2.00	2,00	2,0
8016	Red. +4V Power Supply	Red Clk ON	/.DC	NA NA	2,30	2,30	2,30	2.00	2,30	2,:
8017	Pri, The Power Supply	Pri. Clk ON	VDC	NA		2.30	2.30	2.50		2.
8018	Red. +6V Power Supply	Red Clk ON	VDC	NA	2, 31				2.30	5.
8019	Pri 6V Power Supply	Pri. Clk ON	VDC	NA	5, 23	5, 23	5, 23	5, 28	5, 23	
8020	Red 6V Power Supply	Red. Clk ON	VDC	NA	5, 23	5.23	5.23	5, 23	5, 25	5.1
8021	Pri, - 23V Power Supply	Pri, Clk ON	VDC	NA	5, 70	5.70	5,70	5, 70	5, 70	5,
8022	Red - 23V Power Supply	Red Clk ON	VDC	NA.	5, 65	5,65	5,65	5, 65	5, 65	ā,
8023	Pri 29\ Power Supply	Pri. Clk ON	VDC	N A	5,30	5,29	5,29	5, 29	5, 29	5,
8024	Red - 29V Power Supply	Red Clk ON	VDC .	NA.	5, 29	5,29	5.29	5, 29	5, 29	5.
8101	CIU A - 12V	CIU A ON	VDC .	3,79	3,97	3.97	3,97	3.97	ə. 97.	0.
8102	CIU B - 12V	CIU B ON	VDC	3.78	3,95	3.95	3,95	E, 95	ະ. 95	
8103	CIU A - 5V	CIU A ON	VDC .	3, 93	4.15	4.15	4,14	4, 14	4, 14	1.
8104	CIUB-5V	CIU B ON	VDC	3,90	1,10	4.10	4.10	4.10	4.10	1.
8105	CIU A Temp	CIUAON	DGC	26.01	22,50	21.67	21.50	21,68	21, 56	21.
8106	CIU B Temp	CIU B ON	- DGC	23,35	20,38	19,70	19,52	19.72	19, 56	. 19.
8201	Receiver RF-A Temp	-	DGC	NA	30,02	29,14	29,10	29.67	29, 64	29.
8202	Receiver RF-B Temp	_	DGC	29, 09	F	r	F	24,01	24.00	24.
8203	D MOD A Temp		DGC	28,95	39,20	38.56	38, 19	39,30	39, 57	39.
8204	D MOD B Temp	1	DGC	37,73	27,56	26.72	26,66	27, 92	27, 83	28.
5205	Receiver A AGC	Receiver A ON	DGC	F	-92.18	-91.43	-93.02	-89,62	-89, 82	-89.
8206	Receiver B AGC	Receiver B ON	DBM	-87.83	F	F	F	**	4.4	-85,
8207	Amp. A Output	Receiver A ON	TMV	F	2.51	2,51	2, 55	2,68	2.68	2,
		Receiver B ON	TMV	2, 10	F	F	I,	**	**	2.
8208	Amp. B Output		TMV	F F	1,08	1.08	1.08	1.10	1.08	ī.
8209	Freq. Shift Key A Out	Receiver A ON		1, 11		F	F	**	**	ı .
8210	Freq. Shift Key B Out	Receiver B ON	TMV		ŀ	1.13	1.12	1.12	1, 12	1.
8211	Amp. A Cutput	Receiver A ON	TMV	F	1, 12	1.13 F	F	**	**	1.
8212	Amp, B Output	Receiver B ON	TMV	1.13	F		4.87	4.87	4.87	1.
8215	D MOD A - 157	Receiver A ON	TMV	F	4.87	1,87 F	1.07	4.01	4.51	3
8216	D MOD B - 15V	Receiver B ON	TMV	4,77	F		ľ		J.	4.
8217	Regulator A - 10V	Receiver A ON	TMV	F	5.40	5.40	5.10	5.40 **	5. 40 **	5.
8218	Regulator B - 10\	Receiver B ON	TMV	5, 32	F	F	F			. 5.
8311	ECAM Mem. Tmp	ECVM ON	DCC	NA	18,03	18.44	18,66	18, 24	18, 11	18,
8312	ECAM Pwr Spply Temp	ECAM ON	DGC	NA	23, 13	23,13	23, 32	22,61	22, 49	22,

NA - Not available due to processing problem - MT 710 F - OFF

# TELEMETRY SUBSYSTEM (TLM)

The TLM has operated nominally in this report period.

Table 6-1 shows typical telemetry values since launch. All are nominal except for functions 1264 (Thermal Shield 5 Temperature), 4002 (MMCA Board 2 Temperature), and 13200 (APU 24 Volt Input), which were defective before launch. Verification of these functions is acceptable by adjacent temperature and downstream voltage measurements respectively.

The memory section of the telemetry matrix remains in the 0.0 mode.

Table 6-1. Landsat-2 TMP Telemetry Values

								100	Ĭ .		
1	Func.				O <sub>1</sub>	rbit					1
Į	No.	Function Name	Unit	35	2467	5091	6362	6761	7210	7641	
-	9001	Memory Sequencer A Converter	VDC	4.45	4.45	4.45	4.45	4.45	4,45	4.45	
	9002	Memory Sequencer B Converter	VDC	**	**	**	**	**	**	**	
	9003	Memory Sequencer Temp	°C	20.00	20.77	21.37	20.87	19.79	19.57	20.46	
	9004	Formatter A Converter	VDC	4, 52	4.51	4, 52	4.51	4.52	4,51	4.50	
	9005	Formater B Converter	VDC	**	**	**	**	**	**	**	
	9006	Dig. Mux A Converter	VDC	4,22	4.22	4,22	4.22	4.22	4.21	4.21	1
	9007	Dig. Mux B Converter	VDC	**	**	**	**	**	**	**	
	9008	Formatter/Dig Mux Temp	°C	25,00	23,98	27.80	24.75	24.41	23, 54	22.51	
	9009	Analog Mux A Converter	VDC	4.02	4.05	4.05	4.05	4.05	4.05	4.05	
	9010	Analog Mux B Converter	VDC	**	**	**	**	**	**	**	
	9011	A/D Converter A Voltage	VDC	4.02	4.02	4.03	4.04	4,03	4.03	4.04	H
- !	9012	A/D Converter B Voltage	VDC -	**	**	**	**	**	**	**	
	9013	Analog Mux, A/D Conv. Temp	°C	25.00	24.91	27.33	25.68	24.79	24.61	25,00	
	9014	Preregulator A Voltage	VDC	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
. !	9015	Preregulator B Voltage	VDC	**	**	**	**	**	**	**	
. 1	9016	Reprogrammer Temp	°C	22.50	22.27	24.74	22.30	22.26	21, 83	21.89	
	9017	Memory A Converter	VDC	4.45	4.45	4.45	4.45	4.45	4.45	4.45	
	9018	Memory A Temp	°C	17.50	17.33	17, 17	16.92	15.75	15, 96	15, 62	
1	9019	Memory B Converter	VDC	**	**	**	**	**	**	**	
	9020	Memory B Temp	°C	17,50	17,28	17.41	17.29	16.71	16.49	17.45	
	9100	Reflected Power (Xmtr A)	dBm	18.29	13.68	14.18	13.83	13,76	13.76	13.88	
	9101	Xmtr A-20 VDC	VDC	3.80	3.98	3.97	3.97	3.97	3, 97	3.97	
	9103	Xmtr A Temp	°c	27.73	20.97	26.40	21.51	20.89	20,80	21.06	
	9104	Xmtr B Temp	°c	*	22.07	27.74	22.60	21.98	21, 86	22, 13	
	9105	Xmtr A Power Output	dBm	27.73	26.19	26.29	26.19	26, 19	26, 19	26.19	
	9106	Xmtr B Power Output	dBm	**	**	**	**	**	**	**	

<sup>\*</sup> Not available due software

<sup>\*\*</sup> Not turned on since Prelaunch

# SECTION 7 ORBIT ADJUST SUBSYSTEM (OAS)

The Orbit Adjust Subsystem on Landsat-2 has been fired ten times since launch, 6 times using the -X thruster and 4 times using the +X thruster. One firing of the -X and +X thruster each was for alignment tests. Three +X firings and two -X firings were made to phase the satellite with Landsat-1 to obtain a combined nine day ground track repeat pattern. Three -X firings were for orbit maintenance.

No firing of the OAS was made during this report period (See Section 2 also).

The Subsystem activity since launch is summarized in Table 7-1. A total of 6.87 lbs. of hydrazine has been expended so far from the pre-launch load of 67 lbs.

The OAS telemetry has consistently shown normal pressure temperature parameters. A sampling of the same is given in Table 7-2. The variations in the thrust chamber temperatures in Table 7-2 are consistent with the variations in sun intensity and sun angle.

Table 7-1. Landsat-2 Orbit Adjust Summary

Orbit	Orbit Adjust No.	Ignition Epoch	Burn Duration (Seconds)	+Δa (Meters)	Engine Performance Efficiency %	Fuel <sup>1</sup> Used (Lbs)	Tank Pressure (PSIA)	Tank Temperature (° F)	Thruster Axis
32	1	25 Jan 75 00 34 00.8	4.8	39	104.3	0.02	539.96	72.0	-X
71	2	27 Jan 75 19 57 00.8	4.8	-36	90.1	0.02	547.46	73.5	+X
79	3	28 Jan 75 09 49 00.8	420.0	3455	107.0	1.62	547.46	73.5	-x
86	4	28 Jan 75 21 13 00.8	420.0	3233	107.0	1.51	502.46	73.5	-X
163	5	3 Feb 75 10 36 00.8	420.0	-2974	97.0	1.42	468.75	75.0	+X
191	6	5 Feb 75 10 51 00.8	360.0	-2421	97.5	1.15	438.71	75.0	+X
212	7	6 Feb 75 22 31 00.8	308.8	-2009	98.6	0.95	416.21	75,0	+X
880	8	26 Mar 75 21 44 00.8	12.8	82	107.6	0.04	397.47	70.5	-X
1632	9	19 May 75 18 54 00.8	24.0	+154	107.6	0.07	401.21	73.5	-x
2958	10	22 Aug 75 22 11 58.8	22.0	146	110.3	0.07	404.96	73.5	-x

<sup>&</sup>lt;sup>1</sup> Initial Fuel Capacity - 67 lbs.

Table 7-2. Landsat-2 OAS Telemetry Values

Function					Orbit				
No.	Name	Units	50	2532	5102	-6362	6761	7210	7641
2001	Prop. Tank Temp.	°C	23.03	23.05	23.89	23.05	22,63	22.22	22.22
2003	Thrust Chamber No. 1 (-X) Temp. *	°C	24.84	30.14	25,12	29.18	30.93	30, 90	28.57
2004	Thrust Chamber No. 2 (+X) Temp.*	°C	37.34	38.41	38.55	39.50	39.54	39.12	39, 29
2005	Thrust Chamber No. 3 (-Y) Temp.*	°C	47.22	34.20	46.35	36.53	33.97	33.61	34.82
2006	Line Pressure	psia	545.60	404.97	413.25	414, 12	414.17	414.08	415, 39

<sup>\*</sup>Widespread of temperature is due to nozzle locations and satellite day/night transitions relative to data averaged.

Typical orbital range is from 19 to 59 DGC.

# MAGNETIC MOMENT COMPENSATING ASSEMBLY (MMCA)

The Spacecraft was corrected for unbalanced magnetic moments in Orbits 293 and 321 as reported earlier. These adjustments were made on the pitch magnetic rod of the MMCA.

No adjustment to the MMCA dipoles was made during this report period.

Orbital averages of MMCA telemetry functions for selected orbits are given in Table 8-1.

Table 8-1. Landsat-2 MMCA Telemetry Values

					Or	bit			
Function	Name	Units	50	2532	5102	6362	6761	7210	7641
4001	Al Board Temp	°C	20.56	19.82	19.47	19.41	19.35	19.22	19.20
4002	A2 Board Temp	°C	*	*	*	*	*	*	*
4003	Hall Current	$ ext{TMV}$	3.40	3,40	3,40	3.40	3.40	3.40	3, 40
4004	Yaw Flux Density	$_{ m TMV}$	3.05	3.07	3.07	3,06	3.07	3,07	3,07
4005	Pitch Flux Density	$_{ m TMV}$	3.15	2.90	2,90	2,90	2.90	2.90	2,90
4006	Roll Flux Density	TMV	2.99	2.98	2,97	2,97	2,97	2, 97	2.97

<sup>\*</sup>Defective Telemetry Function (Pre-Launch)

# UNIFIED S-BAND/PREMODULATION PROCESSOR (USB/PMP)

The USB Subsystem has operated nominally in this report period.

Table 9-1 shows telemetry values since launch. All are nominal. The transmitter has maintained a steady indicated power output of about 1.4 watts since launch. Figure 9-1 shows AGC readings of Goldstone for a constant position in space. The scatter of data points reflect variations in the ground station calibration and readout.

Table 9-1. Landsat-2 USB/PMP Telemetry Values

1							ORBITS	<del></del>	<del></del>	
No.	Function Name	Units	T/V (20 <sup>0</sup> C)	15	2462	5091	6362	6761	7210	7641
11001	USB Revr AGC	DBM	NA	-112.72	-128.8	-124,29	-131,50	-128,46	-123.39	-122, 37
11002	USB Xmtr Pwr	WTS	1.40	1.36	1.43	1.38	1.37	1, 37	1.40	1, 37
11003	USB Revr Error	KHz	NA	-2.15	-4.64	-2,97	-4.05	-3,41	-3.96	-4.30
11004	USB Xpond Temp	DGC	22.93	25.88	24.37	27.49	24.60	24, 46	24.44	24. 12
11005	USB Xpond Press	PSI	16.99	17.08	16.74	16.49	16.19	16,00	15,95	15.94
11007	USB Xmtr A -15V	VDC	2.35	2.36	F	F	F	F	F	F
11008	USB Xmtr B -15V	VDC	2.39	F	2.40	2,42	2.40	2.39	2.45	2,39
11009	USB Range -15V	VDC	2.07	2.07	2.07	2.06	2,05	2.05	2,05	2,05
11101	PMP Pwr A Volt	VDC	-15.22	-15.10	F <sub>.</sub>	F	F	F	F	$\mathbf{r}$
11102	PMP Pwr B Volt	VDC	-15.07	F	-15.02	-14.99	15,01	-14.99	-14.98	-14.99
11103	PMP Temp A	DGC	NA	37.30	29.12	34.67	29.61	28.77	28.52	28,36
11104	PMP Temp B	DGC	NA	28.34	30.57	36.08	31.03	30.39	30,19	29, 62

F Unit OFF in this period.

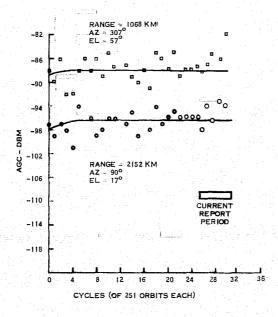


Figure 9-1. USB (Link 4) AGC Readings at Goldstone with 30' Antenna, Landsat-2

# ELECTRICAL INTERFACE SUBSYSTEM (EIS) LANDSAT-2

The Auxiliary Processing Unit (APU) consisting of Search Track Data, Time Code Data, and Back-up Timers operated satisfactorily throughout this report period. Telemetry for the APU is shown in Table 10-1.

Table 10-1. Landsat-2 APU Telemetry Functions

			Orbit						
Function	Description	Unit	21	2532	5102	6362	6761	7210	7641
13200	APU, -24.5 VDC	$\mathbf{T}\mathbf{M}$	*	*	*	*	*	*	*
13201	APU, -12 Volts	TMV	2.42	2.45	2.45	2.45	2.45	2.45	2.45
13202	APU Temp	DGC	27.44	26.60	27.70	26,37	26.27	26.17	26.21

<sup>\*</sup> Defective Telemetry (Prelaunch)

The Power Switching Module (PSM) containing the switching relays for power to the OAS, MSS, WBVTR No. 1 and No. 2, RBV and PRM, functioned normally. During this report period, the MSS as well as WBVTR No. 2 power circuits, have been operated on a regular basis. RBV power circuits have been operated during the periodic tests on 1, 2 and 3 March 1976.

The Interface Switching Module performed all switchings normally during this report period.

#### THERMAL SUBSYSTEM (THM)

The Thermal Control Subsystem on Landsat-2 has provided excellent temperature control of all space-craft equipments since launch,

Table 11-1 gives average subsystem telemetry values for several representative orbits during the last eighteen months of operation of Landsat-2. Average temperatures of the sensory ring bays are plotted in Figure 11-1.

During this report period, the sun intensity varied from 0.989 to 0.969 of the mean value and the average spacecraft temperatures remained more or less constant. However, temperatures are expected to increase in the on-coming period of higher sun intensity.

During orbit 6735 (17 May 1976) the compensation load configuration was switched from 3, 4, 8 ON to 2, 3, 6 ON. This was done to reduce the temperature gradient among batteries. A history of compensation load switchings since launch is given in Table 11-2.

Table 11-1. Landsat-2 Thermal Subsystem Analog Telemetry (Average Value for Frames of Data Received in NBTR Playback)

Function   No.   Description	4.4			r		Orbits			
7002 THM TH02 SBO 7003 THM TH03 STI 7004 THM TH03 STI 7005 THM TH010 STI 7005 THM TH05 SBO 7007 OA-X Thruster 7008 THM TH05 SBO 7007 OA-X Thruster 7008 THM TH06 SBI 7010 THM TH07 STI 7011 THM TH08 SBO 7012 THM TH08 SBO 7014 THM TH08 SBO 7014 THM TH10 SBO 7014 THM TH11 STI 7015 THM TH11 STI 7017 RBV Beam Ctr Ln 7018 THM TH14 STO 7019 NBR Rad Outbd B4 7020 THM TH3 STI 7021 THM TH3 SBI 7021 THM TH3 SBI 7022 THM TH3 SBI 7022 THM TH3 SBI 7023 THM TH3 SBI 7021 THM TH3 SBI 7023 THM TH3 SBO 7030 THM TH3 SBI 7021 THM TH6 STI 7022 THM TH12 SBO 7030 THM TH03 BUR 7033 THM TH2 BUR 7035 THM TH2 BUR 7040 THM TH01 TCB 7041 THM TH04 TCB 7042 THM TH05 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH11 TCB 7048 THM TH11 TCB 7048 THM TH12 TCB 7050 THM TH13 TCB 7051 THM TH14 TCB 7052 THM TH15 TCB 7053 THM TH16 TCB 7054 THM TH17 TCB 7056 THM TH18 TCB 7057 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7069 THM Shutter By 1 7060 THM Shutter By 1 7061 THM Shutter By 1 7062 THM Shutter By 1 7063 THM Shutter By 1 7064 THM Shutter By 1 7065 THM Shutter By 1 7066 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7069 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter By 1 7076 THM Shutter B	Description	Unit	21	2532	5102	6362	6761	7210	7641
7003 THM TH02 SBO 7003 THM TH03 STI 7004 THM TH103 STI 7006 THM TH104 STI 7006 THM TH05 SBO 7007 OA-N Thruster 7008 THM TH05 SBO 7009 THM TH06 SBI 7100 THM TH07 STI 7011 THM TH08 STO 7012 THM TH08 STO 7012 THM TH08 STO 7012 THM TH08 STO 7013 THM TH10 SBO 7014 THM TH10 SBO 7014 THM TH11 STI 7015 THM TH11 STI 7016 THM TH11 STI 7017 RBV Beam Ctr Ln 7018 THM TH14 STO 7019 NBR Rad Outbd B4 7020 THM TH05 SBI 7021 THM TH16 STI 7021 THM TH16 STI 7021 THM TH16 STI 7021 THM TH18 SBO 7030 THM TH3 SBI 7033 THM TH3 BBI 7033 THM TH3 BBI 7033 THM TH3 BBI 7034 THM TH05 TCB 7040 THM TH01 TCB 7041 THM TH05 TCB 7042 THM TH05 TCB 7043 THM TH04 TCB 7044 THM TH07 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH13 TCB 7050 THM TH13 TCB 7051 THM TH13 TCB 7052 THM TH14 TCB 7053 THM TH14 TCB 7054 THM TH17 TCB 7055 THM TH18 TCB 7056 THM TH18 TCB 7057 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 70		DGC	19.40	19, 59	19, 97	19,44	18, 56	18, 54	18,63
7004 THIM THIO TCB 7005 THIM THIO SBO 7007 OA-N Thruster 7008 THIM THO6-STO 7009 THIM THO6-STO 7009 THIM THO6-STO 7009 THIM THO6-STO 7009 THIM THO6-STO 7009 THIM THO6-STO 7009 THIM THO6-STO 7011 THIM THO6-STO 7012 THIM THO6-STO 7012 THIM THO8-STO 7012 THIM THO8-STO 7012 THIM THO8-STO 7013 THIM THIO-SBO 7014 THIM THIO-SBO 7015 THIM THIO-SBO 7016 THIM THII-STI 7017 RBN BEAM CUT LA 7018 THIM THII-SSI 7017 RBN BEAM CUT LA 7018 THIM THII-SSI 7019 NBR RAD OUTD BH 7020 THIM THI-SSI 7021 THIM THI-SSI 7021 THIM THI-SSI 7022 THIM THI-SSI 7023 THIM THI-SSI 7023 THIM THI-SSI 7023 THIM THI-SSI 7024 THIM THO-SBI 7035 THIM THI-SBI 7036 THIM THO-SCB 7040 THIM THO-SCB 7041 THIM THO-SCB 7042 THIM THO-SCB 7043 THIM THO-SCB 7044 THIM THO-SCB 7045 THIM THO-SCB 7046 THIM THO-SCB 7047 THIM THO-SCB 7048 THIM THI-SCB 7049 THIM THI-SCB 7040 THIM THI-SCB 7040 THIM THI-SCB 7041 THIM SAUTTER 7052 THIM THI-SCB 7054 THIM THI-SCB 7055 THIM THI-SCB 7065 THIM SAUTTER By 1 7067 THIM SAUTTER By 1 7067 THIM SAUTTER By 1 7067 THIM SAUTTER By 1 7070 THIM SAUTTER By 1 7071 THIM SAUTTER By 1 7072 THIM SAUTTER By 1 7073 THIM SAUTTER By 18 7080 THIM SAUTTER By 18 7080 THIM SAUTTER By 18 7081 THIM QL T Zener V 7082 THIM QL T Zener V 7083 THIM QL T Zener V 7084 THIM QL T Zener V 7085 THIM QL T Zener V 7086 THIM SAUTTER By 1 7097 THIM SWATTR BOT 7098 THIM WBVTR ROCT 7098 THIM WBVTR SEP 1 7099 THIM WBVTR SEP 1 7009 THIM WBVTR SEP 1 7009 THIM WBVTR SEP 1 7009 THIM WBVTR SEP 1 7009 THIM WBVTR SEP 1 7009 THIM WBVTR SEP 1 7009 THIM WBVTR SEP 3 7009 THIM WBVTR SEP 1 7009 THIM WBVTR SEP 3		DGC	17, 18	18,05	17, 47	17.87	17, 48	17,71	17,21
7006 THM TH04 STI 7006 THM TH05 SBO 7007 OA-X Thruster 7008 THM TH06-STO 7009 THM TH06 SBI 7010 THM TH06 SBI 7011 THM TH08 STO 7012 THM TH08 STO 7012 THM TH08 STO 7012 THM TH10 SBO 7014 THM TH10 SBO 7015 THM TH11 STI 7017 RBV Beam Ctr Ln 7018 THM TH13 STI 7017 RBV Beam Ctr Ln 7018 THM TH15 SBI 7021 THM TH15 SBI 7022 THM TH15 SBI 7022 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH18 SBO 7030 THM TH03 Bur 7033 THM TH18 BBO 7030 THM TH03 Bur 7033 THM TH18 BBO 7040 THM TH01 TCB 7041 THM TH05 TCB 7042 THM TH05 TCB 7044 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH08 TCB 7048 THM TH11 TCB 7049 THM TH11 TCB 7049 THM TH11 TCB 7049 THM TH12 TCB 7051 THM TH14 TCB 7060 THM TH13 TCB 7061 THM TH16 TCB 7062 THM TH16 TCB 7063 THM TH17 TCB 7064 THM Shutter By 1 7067 THM Shutter By 2 7068 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7077 THM Shutter By 1 7077 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Q2 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM WBVTR Rod Ct 7095 THM WBVTR Rod Ct 7096 THM WBVTR Rod Ct 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 1 7097 THM WBVTR Bod 7097 THM WBVTR Sep 1 7097 THM WBVTR Bog 7097 THM WBVTR Bog 7097 THM WBVTR Bog 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Bog 7097 THM WBVTR Sep 1 7097 THM WBVTR Bog 7097 THM WBVTR Bog 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Bog 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1		DGC	18.73	19, 49	18, 50	18.77	18.30	18, 62	17,73
7006 THM TH05 SBO 7007 OA-N Thruster 7008 THM TH06-STO 7008 THM TH06-STO 7009 THM TH06-STO 7011 THM TH07 STI 7011 THM TH08 STO 7012 THM TH08 STO 7012 THM TH10 SBO 7014 THM TH11 STO 7015 THM TH12 SBO 7016 THM TH11 STI 7015 THM TH12 SBO 7016 THM TH13 STI 7017 RBN Beam Ctr Ln 7018 THM TH14 STO 7019 NER RAG OUTD BH 7020 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH17 SBI 7022 THM TH17 SBI 7023 THM TH18 SBO 7030 THM TH03 BUR 7033 THM TH18 BUR 7040 THM TH05 TCB 7041 THM TH07 TCB 7041 THM TH07 TCB 7041 THM TH07 TCB 7042 THM TH07 TCB 7043 THM TH07 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH17 TCB 7048 THM TH11 TCB 7049 THM TH11 TCB 7051 THM TH12 TCB 7052 THM TH17 TCB 7054 THM TH16 TCB 7055 THM TH17 TCB 7066 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7069 THM Shutter By 1 7060 THM Shutter By 1 7061 THM Shutter By 1 7062 THM Shutter By 1 7063 THM Shutter By 1 7064 THM Shutter By 1 7065 THM Shutter By 1 7066 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7090 THM Shutter By 1 7091 THM Shutter By 1 7092 THM Shutter By 1 7094 THM Shutter By 1 7095 THM Shutter By 1 7096 THM Shutter By 1 7097 THM Shutter By 1 7098 THM WBVTR Rod Ct 711 WBVTR Rod 7097 THM WBVTR Bop 7		DGC	19, 38	19, 01	19.34	18,50	18.76	18, 68	15,64
7007 OA-N Thruster 7008 THM TH06 SBI 7010 THM TH06 SBI 7011 THM TH08 SBI 7012 THM TH09 SBI 7013 THM TH108 STO 7012 THM TH109 SBI 7013 THM TH10 SBO 7014 THM TH10 SBO 7015 THM TH11 STI 7015 THM TH12 SBO 7016 THM TH13 STI 7017 RBV Beam Ctr Ln 7018 THM TH13 STI 7017 RBV Beam Ctr Ln 7018 THM TH14 STO 7019 NBR RAD Gutbd Bi 7020 THM TH15 SBI 7021 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH16 STI 7022 THM TH16 STI 7023 THM TH18 Bur 7033 THM TH103 Bur 7033 THM TH103 Bur 7034 THM TH03 TBR 7040 THM TH01 TCB 7041 THM TH01 TCB 7041 THM TH07 TCB 7042 THM TH07 TCB 7043 THM TH04 TCB 7046 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH11 TCB 7048 THM TH11 TCB 7050 THM TH13 TCB 7061 THM TH14 TCB 7062 THM TH16 TCB 7063 THM TH17 TCB 7064 THM TH18 TCB 7065 THM TH16 TCB 7065 THM TH16 TCB 7066 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7069 THM Shutter By 1 7060 THM Shutter By 1 7061 THM Shutter By 1 7062 THM Shutter By 1 7063 THM Shutter By 1 7064 THM Shutter By 1 7065 THM Shutter By 1 7066 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7069 THM Shutter By 1 7060 THM Shutter By 1 7061 THM Shutter By 1 7062 THM Shutter By 1 7063 THM Shutter By 1 7064 THM Shutter By 1 7065 THM Shutter By 1 7066 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7091 THM Shutter By 1 7092 THM Shutter By 1 7093 THM WBVTR Rod CT 7094 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Bo CT 7110 THM WBVTR Bo CT 7110 THM WBVTR Bo CT 7110 THM WBVTR Bo CT 7110 THM WBVTR Bo CT 7110 THM WBVTR Bo CT 7110 THM WBVTR BO CT 7110 THM WBVTR BO CT 7110 THM WBVTR BO CT 7110 THM WBVTR BO CT 7110 THM WBVTR BO CT 7110 THM WBVTR BO CT 7110 THM WBVTR BO CT 7110 THM WBVTR BO CT 7110 THM WBVTR BO CT 7110 THM WBVTR BO		DGC	17. 19	17. 92	16.76	17.19	17, 12	17.54	16, 30
7008 THM TH06-STO 7009 THM TH07 STI 7010 THM TH07 STI 7011 THM TH08 STO 7012 THM TH09 SBI 7013 THM TH10 SBO 7014 THM TH11 SBO 7016 THM TH11 STI 7016 THM TH12 SBO 7016 THM TH13 STI 7017 RBV Beam Ctr Ln 7018 THM TH14 STO 7019 NBR Rad Outbd B4 7020 THM TH3 SBI 7021 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH15 SBI 7023 THM TH18 SBO 7030 THM TH03 Bur 7033 THM TH18 Bur 7036 THM TH08 TB 7040 THM TH01 TCB 7041 THM TH02 TCB 7041 THM TH02 TCB 7042 THM TH04 TCB 7044 THM TH07 TCB 7046 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH18 TCB 7048 THM TH12 TCB 7049 THM TH12 TCB 7050 THM TH13 TCB 7051 THM TH14 TCB 7060 THM TH15 TCB 7061 THM TH16 TCB 7062 THM TH16 TCB 7063 THM TH17 TCB 7064 THM Shutter By 1 7066 THM Shutter By 2 7067 THM Shutter By 1 7068 THM Shutter By 1 7069 THM Shutter By 1 7060 THM Shutter By 1 7061 THM Shutter By 1 7062 THM Shutter By 1 7063 THM Shutter By 1 7064 THM Shutter By 1 7065 THM Shutter By 1 7066 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Q2 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 S Zener V 7084 THM WBVTR Rod Ct 7095 THM WBVTR Rod Ct 7096 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 3 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 1 7101 THM WBVTR Sep 6 7101 THM WBVTR Sep 6 7106 THM WBVTR Sep 6 7107 THM WBVTR Sep 6 7108 THM WBVTR Sep 6 7109 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR Sep 6 7100 THM WBVTR S		rige	17, 42	17.46	16,68	17.07	16, 83 20, 40	17, 01 20, 29	16,52 20,02
7008 THM TH06 SBI 7010 THM TH07 STI 7011 THM TH08 STO 7012 THM TH08 STO 7012 THM TH08 STO 7014 THM TH10 SBO 7014 THM TH11 SBO 7016 THM TH11 STI 7015 THM TH12 SBO 7016 THM TH13 STI 7017 RBV Beam Ctr Ln 7018 THM TH13 STI 7019 NBR Rad Outbd B4 7020 THM TH15 SBI 7021 THM TH15 SBI 7021 THM TH15 SBI 7022 THM TH15 SBI 7022 THM TH16 STI 7023 THM TH18 BBO 7030 THM TH18 BBO 7030 THM TH18 BBO 7031 THM TH08 TCB 7041 THM TH01 TCB 7041 THM TH02 TCB 7042 THM TH03 TCB 7041 THM TH04 TCB 7041 THM TH05 TCB 7042 THM TH07 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH07 TCB 7048 THM TH11 TCB 7050 THM TH11 TCB 7061 THM TH18 TCB 7062 THM TH13 TCB 7064 THM TH16 TCB 7065 THM TH18 TCB 7060 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 2 7063 THM Shutter By 1 7064 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 1 7079 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7074 THM Shutter By 1 7076 THM Shutter By 1 7077 THM		DCC PUC	19,66 14,78	20, 58 14, 77	19,65 13,94	20,01 14,14	14,00	14, 03	13.78
7010 THM TH07 STI 7011 THM TH08 STO 7012 THM TH09 SBI 7013 THM TH10 SBO 7014 THM TH10 SBO 7014 THM TH11 STI 7015 THM TH12 SBO 7016 THM TH13 STI 7017 RBV Beam Ctr Ln 7018 THM TH13 STI 7017 RBV Beam Ctr Ln 7018 THM TH14 STO 7019 NBR RAD Gutbd Bi 7020 THM TH15 SBI 7021 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH16 STI 7022 THM TH16 STI 7023 THM TH18 SBO 7030 THM TH10 Bur 7031 THM TH10 THD 7031 THM TH10 THD 7041 THM TH10 TCB 7041 THM TH01 TCB 7041 THM TH01 TCB 7042 THM TH03 TCB 7043 THM TH04 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH09 TCB 7046 THM TH11 TCB 7046 THM TH11 TCB 7047 THM TH14 TCB 7048 THM TH14 TCB 7050 THM TH13 TCB 7051 THM TH14 TCB 7061 THM TH15 TCB 7062 THM TH16 TCB 7063 THM Shutter By 1 7064 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7071 THM Shutter By 18 7072 THM Shutter By 18 7073 THM Shutter By 18 7074 THM Shutter By 18 7075 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7077 THM Shutter By 18 7078 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM WBVTR Bot 7091 THM WBVTR Root 7092 THM WBVTR Root 7093 THM WBVTR Root 7094 THM WBVTR Root 7095 THM WBVTR Root 7096 THM WBVTR Sep 1 7110 THM WBVTR		DGC	19.18	12. 18	18, 11	18,49	18,28	18, 24	18.00
7011 THM TH08 STO 7012 THM TH09 SBI 7013 THM TH10 SBO 7014 THM TH11 STI 7015 THM TH11 STI 7016 THM TH13 STI 7017 RBV Beam Ctr Ln 7018 NBR Rad Outbd B4 7020 THM TH15 SBI 7021 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH16 STI 7022 THM TH18 SBO 7030 THM TH3 SBO 7030 THM TH3 SBO 7030 THM TH3 SBO 7040 THM TH03 Bur 7035 THM TH18 Bur 7040 THM TH01 TCB 7041 THM TH02 TCB 7041 THM TH02 TCB 7042 THM TH03 TCB 7044 THM TH05 TCB 7044 THM TH05 TCB 7045 THM TH10 TCB 7046 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH18 TCB 7048 THM TH12 TCB 7048 THM TH12 TCB 7050 THM TH13 TCB 7051 THM TH14 TCB 7052 THM TH15 TCB 7051 THM TH16 TCB 7052 THM Sbutter By 1 7061 THM Sbutter By 1 7061 THM Sbutter By 2 7062 THM Sbutter By 3 7063 THM Sbutter By 1 7064 THM Sbutter By 1 7065 THM Sbutter By 1 7067 THM Sbutter By 1 7068 THM Sbutter By 1 7070 THM Sbutter By 1 7071 THM Sbutter By 13 7072 THM Sbutter By 13 7073 THM Sbutter By 16 7073 THM Sbutter By 16 7075 THM Sbutter By 17 7076 THM Sbutter By 18 7076 THM Sbutter By 18 7077 THM Sbutter By 19 7078 THM Sputter By 18 7079 THM Sbutter By 18 7070 THM Sbutter By 19 7071 THM Sbutter By 18 7072 THM Sbutter By 19 7073 THM Sbutter By 18 7074 THM Sbutter By 18 7075 THM Sbutter By 18 7076 THM Sbutter By 18 7076 THM Sbutter By 18 7077 THM Sbutter By 18 7078 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q2 S Zener V 7084 THM WBVTR Rod Ct 7095 THM WBVTR Rod Ct 7096 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 3 7100 THM WBVTR 2 By 16 7097 THM WBVTR Sep 1 7098 THM WBVTR 2 By 16 7097 THM WBVTR Sep 3 7100 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 3 Epg 7101 THM WBVTR 1 Cent 7102 THM WBVTR Sep 1 7103 THM WBVTR Sep 1 7104 THM WBVTR 2 By 16 7107 THM WBVTR Bou 7107 THM WBVTR 3 Epg 7107 THM WBVTR 1 Epg 7107 THM WBVTR 1 Epg 7107 THM WBVTR 2 By 16 7107 THM WBVTR 3 Epg 7107 THM WBVTR 3 Epg 7108 THM WBVTR 3 Epg 7109 THM WBVTR 3 Epg 7100 THM WBVTR 3 Epg 7100 THM WBVTR 3 Epg 7100 THM WBVTR 3 Epg 7100 THM WBVTR 3 Epg 7100 THM WBVTR 3 Epg 7100 THM WBVTR 3 Epg		DGC	18, 08	18, 26	17, 44	17.54	17.85	17, 81	17, 56
7012 THM TH00 SBI 7013 THM TH10 SBO 7014 THM TH11 STI 7015 THM TH11 STI 7016 THM TH11 STI 7017 RBV Beam Ctr Ln 7018 THM TH14 STO 7019 NBR Rad Outbd B4 7020 THM TH15 SBI 7021 THM TH15 SBI 7021 THM TH15 SBI 7022 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH18 SBO 7030 THM TH18 BBO 7030 THM TH18 BBO 7031 THM TH03 Bur 7035 THM TH18 Bur 7040 THM TH01 TCB 7041 THM TH02 TCB 7042 THM TH03 TCB 7041 THM TH04 TCB 7042 THM TH05 TCB 7044 THM TH05 TCB 7045 THM TH04 TCB 7046 THM TH07 TCB 7047 THM TH07 TCB 7048 THM TH11 TCB 7049 THM TH12 TCB 7050 THM TH13 TCB 7061 THM TH13 TCB 7061 THM TH16 TCB 7062 THM TH18 TCB 7063 THM TH18 TCB 7064 THM Shutter By 1 7067 THM Shutter By 2 7063 THM Shutter By 2 7064 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 1 7073 THM Shutter By 1 7074 THM Shutter By 1 7075 THM Shutter By 15 7075 THM Shutter By 16 7075 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 18 7077 THM Shutter By 18 7078 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 S Zener V 7084 THM WBVTR Rad Ct 7095 THM WBVTR Rad Ct 7096 THM WBVTR Rad Ct 7097 THM WB Mt Bay 1 7098 THM WBVTR Rad Ct 7097 THM WBVTR Sep 3 7098 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7091 THM WBVTR Sep 1 7092 THM WBVTR Sep 1 7093 THM WBVTR Sep 1 7094 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7091 THM WBVTR Sep 1 7091 THM WBVTR Sep 1 7092 THM WBVTR Sep 1 7093 THM WBVTR Sep 1 7094 THM WBVTR Sep 1 7095 THM WBVTR Sep 1 7096 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7090 THM W		DGC	19.34	20, 22	19,23	19.65	20, 12	20,05	19.74
7013 THM TH10 SBO 7014 THM TH11 STI 7015 THM TH12 SBO 7016 THM TH13 STI 7017 RBV Beam Ctr Ln 7018 THM TH13 STI 7018 THM TH13 STI 7019 NBR RAG Outbd B4 7020 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH16 STI 7022 THM TH16 STI 7023 THM TH18 BD 7030 THM TH18 BU 7031 THM TH18 BU 7031 THM TH18 BU 7032 THM TH18 BU 7033 THM TH18 BU 7040 THM TH01 TCB 7041 THM TH02 TCB 7042 THM TH03 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH09 TCB 7046 THM TH09 TCB 7046 THM TH09 TCB 7047 THM TH11 TCB 7046 THM TH11 TCB 7046 THM TH11 TCB 7047 THM TH11 TCB 7048 THM TH11 TCB 7050 THM TH13 TCB 7051 THM TH14 TCB 7062 THM Shutter By 2 7062 THM Shutter By 2 7063 THM Shutter By 1 7064 THM Shutter By 1 7065 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7069 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 12 7071 THM Shutter By 18 7072 THM Shutter By 18 7073 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM WBVTR Rod 7095 THM WBVTR Rod 7096 THM WBVTR Rod 7097 THM WBVTR Rod 7097 THM WBVTR Rod 7098 THM WBVTR Rod 7099 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 1 7110 THM WBVTR Sep 6 7110 THM WBVTR Sep 6 7110 THM WBVTR B Sep 6 7110 THM WBVTR B Sep 6 7110 THM WBVTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 1 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6 7110 THM MBTR B Sep 6		DGC	21,44	21, 80	20, 93	20,75	20.91	20,80	20,65
7015 7016 7016 7016 7016 7017 7017 7017 7018 7018 7018 7018 7018		DGC	18.58	18, 56	18.39	18, 13	18, 17	18, 10	18,05
7016 THM TH13 STI 7017 RBN Beam Ctr Ln 7018 THM TH14 STO 7019 NBR RAG Outbd B4 7020 THM TH15 SBI 7021 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH16 STI 7022 THM TH18 SBO 7030 THM TH18 BUR 7035 THM TH18 BUR 7035 THM TH18 BUR 7045 THM TH10 BUR 7046 THM TH01 TCB 7041 THM TH02 TCB 7042 THM TH03 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH09 TCB 7046 THM TH09 TCB 7047 THM TH11 TCB 7048 THM TH11 TCB 7050 THM TH11 TCB 7051 THM TH14 TCB 7052 THM TH14 TCB 7052 THM TH14 TCB 7053 THM TH17 TCB 7054 THM TH18 TCB 7055 THM Shutter By 2 7066 THM Shutter By 1 7061 THM Shutter By 1 7061 THM Shutter By 1 7062 THM Shutter By 1 7063 THM Shutter By 1 7064 THM Shutter By 1 7067 THM Shutter By 1 7068 THM Shutter By 1 7069 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 18 7072 THM Shutter By 18 7073 THM Shutter By 18 7074 THM Shutter By 18 7075 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7077 THM Shutter By 18 7078 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM WBVTR Rod 7097 THM WBVTR Rod 7097 THM WBVTR Rod 7097 THM WBVTR Rod 7097 THM WBVTR Rod 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 3 7100 THM WBVTR Sep 6 7101 THM WBVTR 2 By 16 7102 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7108 THM WBVTR 2 By 16 7109 THM WBVTR 2 By 16 7100 THM WBVTR 2 By 16 7101 THM WBVTR 2 B		DGC	21.65	21.13	21,93	20,64	20,73	20, 59	20,61
7018 7018 7018 7018 7019 7019 7019 7019 7020 711M TH15 SBI 7021 71M TH15 SBI 7021 71M TH15 SBI 7022 71M TH15 SBI 7022 71M TH15 SBI 7023 71M TH18 SBO 7030 71M TH18 SBO 7030 71M TH18 Bur 7035 71M TH18 Bur 7040 7041 7041 7041 7042 7041 7042 7043 7044 7044 7044 7045 7044 7046 7044 7047 7048 7048 7048 7049 7048 7049 7049 7049 7049 7049 7040 7040 7040	THM TH12 SBO	DGC	23, 93	22, 13	24,68	22,29	21.82	21,79	21,88
7018 THM TH14 STO 7019 NBR Rad Outbd B4 7020 THM TH15 SB1 7021 THM TH16 ST1 7022 THM TH16 ST1 7022 THM TH17 SB1 7023 THM TH18 SB0 7030 THM TH38 BB0 7030 THM TH38 BB0 7030 THM TH38 BB0 7031 THM TH38 BB1 7041 THM TH01 TCB 7041 THM TH02 TCB 7042 THM TH03 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH07 TCB 7048 THM TH11 TCB 7049 THM TH12 TCB 7050 THM TH12 TCB 7051 THM TH12 TCB 7052 THM TH13 TCB 7052 THM TH16 TCB 7052 THM TH16 TCB 7054 THM Shutter By 1 7066 THM Shutter By 1 7067 THM Shutter By 2 7068 THM Shutter By 9 7068 THM Shutter By 1 7067 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 16 7075 THM Shutter By 16 7076 THM Shutter By 17 7076 THM Shutter By 18 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 S Zener V 7085 THM WBVTR Rad Ct 7096 THM WBVTR Rad Ct 7097 THM WB Mt Bay 1 7099 THM WBVTR Sep 3 7100 THM WBVTR Sep 1 7101 THM WBVTR Sep 1 7101 THM WBVTR Sep 1 7101 THM WBVTR B Sep 6 7106 THM WBVTR B Sep 6 7107 THM WBVTR B Sep 6 7108 THM WBVTR B Sep 6 7109 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6 7100 THM WBVTR B Sep 6		DGC	22, 21	20, 51	23,62	20,66	20, 35	20, 19	20, 24
7019  NBR RAG Outbel 14  7020  THM TH15 SBI  7021  THM TH16 STI  7022  THM TH16 STI  7022  THM TH17 SBI  7033  THM TH18 SBO  7030  THM TH18 BUR  7035  THM TH18 BUR  7035  THM TH18 BUR  7040  THM TH01 TCB  7041  THM TH01 TCB  7041  THM TH02 TCB  7042  THM TH05 TCB  7045  THM TH05 TCB  7046  THM TH09 TCB  7047  THM TH11 TCB  7048  THM TH11 TCB  7050  THM TH12 TCB  7051  THM TH13 TCB  7052  THM TH13 TCB  7052  THM TH14 TCB  7053  THM TH17 TCB  7064  THM Shutter By 1  7061  THM Shutter By 2  7062  THM Shutter By 5  7063  THM Shutter By 5  7065  THM Shutter By 1  7067  THM Shutter By 1  7070  THM Shutter By 12  7071  THM Shutter By 13  7072  THM Shutter By 15  7074  THM Shutter By 18  7075  THM Shutter By 18  7076  THM Shutter By 18  7076  THM Shutter By 18  7077  THM Shutter By 18  7078  THM Q1 T Zener V  7081  THM Q2 T Zener V  7082  THM Q3 T Zener V  7084  THM Q3 S Zener V  7085  THM WBVTR Rod C  THM WBVTR Rod C  THM WBVTR Rod C  THM WBVTR Sep 1  THM WBVTR Sep 1  THM WBVTR Sep 3  THM WBVTR Sep 3  THM WBVTR Sep 6  THM WBVTR 1 Cent  THM WBVTR 1 Cent  THM WBVTR 1 Cent  THM WBVTR 1 Cent  THM WBVTR 1 Cent  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 16  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 1  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 16  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 17  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 17  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 17  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 17  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 17  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 17  THM WBVTR 2 Sep 17  THM WBVTR 1 Sep 6  THM WBVTR 2 Sep 17  THM WBVTR 1 Sep 6  THM WBV		DGC	20, 38	20, 33	19.92	19,16	19, 21	19,07	19, 09
7020 THM TH15 SBI 7021 THM TH16 STI 7022 THM TH17 SBI 7023 THM TH18 SBO 7030 THM TH3 SBO 7030 THM TH3 SBO 7030 THM TH3 SBO 7031 THM TH3 SBO 7030 THM TH3 Bur 7035 THM TH3 Bur 7040 THM TH01 TCB 7041 THM TH02 TCB 7042 THM TH03 TCB 7043 THM TH05 TCB 7044 THM TH05 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH11 TCB 7048 THM TH11 TCB 7050 THM TH13 TCB 7051 THM TH12 TCB 7052 THM TH14 TCB 7053 THM TH14 TCB 7054 THM TH16 TCB 7054 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 2 7063 THM Shutter By 3 7064 THM Shutter By 1 7067 THM Shutter By 1 7076 THM Shutter By 1 7077 THM Shutter By 13 7072 THM Shutter By 13 7073 THM Shutter By 16 7074 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 16 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 18 7077 THM Shutter By 17 7078 THM Q1 T Zener V 7082 THM Q2 T Zener V 7082 THM Q2 T Zener V 7084 THM Q2 T Zener V 7085 THM Q3 T Zener V 7086 THM Q3 S Zener V 7087 THM WB WR Rad Ct 7097 THM WB WR Rad Ct 7097 THM WB WR Rad Ct 7097 THM WB WR Bay 1 7098 THM WB WR Bay 1 7099 THM WB WR Bay 1 7099 THM WB WR Bay 1 7091 THM WB WR Bay 1 7091 THM WB WR Bay 1 7092 THM WB WR Bay 1 7094 THM WB WR Bay 1 7095 THM WB WR Bay 1 7096 THM WB WR Bay 1 7097 THM WB WR Bay 1 7097 THM WB WR Bay 1 7098 THM WB WR Bay 1 7099 THM WB WR Bay 1 7097 THM WB WR Bay 1 7098 THM WB WR Bay 1 7099 THM WB WR Bay 1 7097 THM WB WR Bay 1 7098 THM WB WR Bay 1 7099 THM WB WR Bay 1 7097 THM WB WR Bay 1 7098 THM WB WR Bay 1 7099 THM WB WR Bay 1 7097 THM WB WR Bay 1 7098 THM WB WR Bay 1 7099 THM WB WR Bay 1 7097 THM WB WR Bay 1 7098 THM WB WR Bay 1 7099 THM WB WR Bay 1 7097 THM WB WR Bay 1 7098 THM WB WR Bay 1 7099 THM WB WR Bay 1 7097 THM WB WR Bay 1 7097 THM WB WR Bay 1 7098 THM WB WR Bay 1 7099 THM WB WR Bay 1 7099 THM WB WR Bay 1 7091 THM WB WR Bay 1 7091 THM WB WR Bay 1 7091 THM WB WR Bay 1 7091 THM WB WR Bay 1 7091 THM WB WR Bay 1 7091 THM WB WR Bay 1 70		DGC	24, 12	21, 29	26.43	21,99	21, 24	21.09	21,40
7021 THM TH16 STI 7022 THM TH17 SBI 7023 THM TH18 SBO 7030 THM TH38 BU 7031 THM TH38 BU 7035 THM TH38 BU 7036 THM TH38 BU 7040 THM TH01 CB 7041 THM TH01 TCB 7042 THM TH03 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH07 TCB 7048 THM TH10 TCB 7049 THM TH12 TCB 7050 THM TH12 TCB 7051 THM TH12 TCB 7052 THM TH13 TCB 7052 THM TH14 TCB 7052 THM TH15 TCB 7054 THM SAUTER By 1 7067 THM SAUTER By 2 7068 THM SAUTER By 3 7064 THM SAUTER By 1 7067 THM SAUTER By 1 7067 THM SAUTER By 1 7070 THM SAUTER By 1 7071 THM SAUTER By 1 7072 THM SAUTER By 1 7073 THM SAUTER By 1 7074 THM SAUTER By 16 7075 THM SAUTER By 16 7075 THM SAUTER By 17 7076 THM SAUTER By 18 7077 THM SAUTER BY 18 7078 THM Q1 T Zener V 7081 THM Q2 S Zener V 7082 THM RBV Radiator 7083 THM RBV Radiator 7090 THM WBVTR Rad Ct 7090 THM WBVTR Rad Ct 7090 THM WBVTR Rad Ct 7090 THM WBVTR Rad Ct 7091 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7091 THM WBVTR Sep 1 7091 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7098 THM WBVTR Sep 1 7099 THM WBVTR Sep 1 7090 THM WBVTR Sep 1 7091 THM WBVTR Sep 6 7091 THM WBVTR Sep 6 7091 THM WBVTR B Sep 6 7091 THM WBVTR B Sep 6 7091 THM WBVTR B Sep 6 7092 THM WBVTR B Sep 6 7093 THM WBVTR B Sep 6 7094 THM WBVTR B Sep 6 7095 THM WBVTR B Sep 6 7096 THM WBVTR B Sep 6 7097 THM WBVTR B Sep 6 7098 THM WBVTR B Sep 6 7098 THM WBVTR B Sep 6 7098 THM WBVTR B Sep 6 7098 THM WBVTR B Sep 6 7098 THM WBVTR B Sep 6 7098 THM WBVTR B Sep 6 7099 THM WBVTR B Sep 6 7099 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6 7090 THM WBVTR B Sep 6		DGC	2,72	3, 26	2,93	2.85	2.56	2,48	2,31
7022 THM TH17 SBI 7023 THM TH18 SBO 7030 THM TH18 BUR 7035 THM TH18 BUR 7035 THM TH18 BUR 7036 THM TH18 BUR 7037 THM TH18 BUR 7040 THM TH01 TCB 7041 THM TH02 TCB 7042 THM TH03 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7046 THM TH05 TCB 7047 THM TH19 TCB 7048 THM TH11 TCB 7049 THM TH12 TCB 7050 THM TH13 TCB 7051 THM TH14 TCB 7052 THM TH14 TCB 7052 THM TH18 TCB 7053 THM TH17 TCB 7064 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 5 7065 THM Shutter By 1 7061 THM Shutter By 1 7062 THM Shutter By 1 7063 THM Shutter By 1 7064 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 13 7072 THM Shutter By 18 7072 THM Shutter By 18 7073 THM Shutter By 18 7074 THM Shutter By 18 7075 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7077 THM Shutter By 18 7078 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 S Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM WBVTR Rod CT 7096 THM WBVTR Rod CT 7097 THM WBVTR Rod CT 7097 THM WB Mt Bay 1 7099 THM WBVTR Sep 17 7097 THM WBVTR Sep 3 7100 THM WBVTR Sep 3 7101 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7105 THM WBVTR 2 By 17 7106 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 17 7108 THM WBVTR 2 By 17 7109 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 17 7101 THM WBVTR 3 By 7 7101 THM WBVTR		DGC	23, 07	21, 13	25, 56	21,91	20,83	20, 52	20, 11
7033 THM THIS SBO 7030 THM THOS BUT 7033 THM THOS BUT 7033 THM THOS BUT 7035 THM THOS BUT 7040 THM THOS TCB 7041 THM THOS TCB 7042 THM THOS TCB 7043 THM THOS TCB 7044 THM THOS TCB 7045 THM THOS TCB 7046 THM THOS TCB 7046 THM THOS TCB 7047 THM THOS TCB 7048 THM THOS TCB 7048 THM THOS TCB 7049 THM THOS TCB 7049 THM THOS TCB 7050 THM THIL TCB 7051 THM THOS TCB 7051 THM THOS TCB 7052 THM THOS TCB 7053 THM THOS TCB 7054 THM THOS TCB 7055 THM THOS TCB 7065 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 3 7063 THM Shutter By 1 7065 THM Shutter By 1 7066 THM Shutter By 1 7067 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 13 7072 THM Shutter By 13 7073 THM Shutter By 16 7074 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 18 7077 THM Shutter By 17 7078 THM Shutter By 17 7079 THM Shutter By 17 7081 THM Q3 T Zener V 7082 THM Q3 T Zener V 7082 THM Q3 S Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM WBVTR Rod Ct 7097 THM WBVTR Rod Ct 7097 THM WBVTR Rod Ct 7097 THM WBVTR Sep 3 7100 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7105 THM WBVTR 2 By 16 7106 THM WBVTR 2 By 16 7107 THM WBVTR 1 Cent 7108 THM WBVTR 2 By 16 7109 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 3 Ep 1 7101 THM WBVTR 3 Ep 6 7101 THM WBVTR 3 Ep 6 7101 THM WBVTR 3 Ep 6 7101 THM WBVTR 3 Ep 6 7101 THM WBVTR 3 Ep 6 7101 THM WBVTR 3 Ep 6 7101 THM WBVTR 3 Ep 6 7101 THM WBVTR 3 Ep 6 7101 THM WBVTR 3 Ep 6 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101 THM WBVTR 3 Ep 7 7101		DCC	23,26	22, 29	25, 16	22.79	21.47	21.20	21,07
7030 THM TH03 Bur 7035 THM TH12 Bur 7035 THM TH18 Bur 7040 THM TH01 TCB 7041 THM TH01 TCB 7042 THM TH03 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH07 TCB 7048 THM TH107 TCB 7049 THM TH11 TCB 7050 THM TH12 TCB 7051 THM TH13 TCB 7052 THM TH14 TCB 7052 THM TH15 TCB 7054 THM TH15 TCB 7054 THM TH16 TCB 7055 THM TH16 TCB 7056 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 2 7063 THM Shutter By 3 7063 THM Shutter By 4 7064 THM Shutter By 1 7067 THM Shutter By 1 7077 THM Shutter By 1 7078 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 16 7075 THM Shutter By 18 7086 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 S Zener V 7085 THM WB TR Rad Ct 7090 THM WB TR Rad Ct 7090 THM WB TR Rad Ct 7090 THM WB TR Sep 3 7100 THM WB TR Sep 1 7101 THM WB TR Sep 1 7102 THM WB TR BS 2 7103 THM WB TR BS 6 7104 THM WB TR BS 6 7106 THM WB TR BS 6 7107 THM WB TR BS 6 7107 THM WB TR BS 6 7107 THM WB TR BS 6 7107 THM WB TR BS 6 7107 THM WB TR BS 6 7107 THM WB TR BS 6 7107 THM WB TR BS 6 7107 THM WB TR BS 6 7108 THM WB TR BS 6 7107 THM WB TR BS 6 7108 THM WB TR BS 6 7108 THM WB TR BS 6 7107 THM WB TR BS 6 7108 THM WB TR BS 6 7108 THM WB TR BS 6 7108 THM WB TR BS 6 7108 THM WB TR BS 6 7109 THM WB TR BS 6 7109 THM WB TR BS 6 7100 THM WB		DGC	21,77	21.22	23.74	21.79	20, 15	20,03	20.21
7035 THM TH12 Bur 7040 THM TH18 Bur 7040 THM TH10 TCB 7041 THM TH01 TCB 7042 THM TH02 TCB 7042 THM TH02 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH05 TCB 7046 THM TH05 TCB 7046 THM TH10 TCB 7047 THM TH11 TCB 7051 THM TH12 TCB 7051 THM TH13 TCB 7052 THM TH12 TCB 7052 THM TH13 TCB 7053 THM TH13 TCB 7054 THM TH18 TCB 7055 THM TH18 TCB 7067 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 5 7063 THM Shutter By 5 7063 THM Shutter By 7 7064 THM Shutter By 5 7065 THM Shutter By 1 7067 THM Shutter By 1 7067 THM Shutter By 1 7070 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 16 7075 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7077 THM Shutter By 18 7078 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 T Zener V 7085 THM Q3 T Zener V 7086 THM Q3 T Zener V 7087 THM Q3 T Zener V 7088 THM Q3 T Zener V 7089 THM WBVTR Rod Ct 7091 THM WBVTR Rod Ct 7092 THM WBVTR Rod Ct 7094 THM WBVTR Rod Ct 7095 THM WBVTR Rod Ct 7097 THM WBVTR Sep 1 7097 THM WBVTR 1 Cent 7097 THM WBVTR 1 Cent 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7098 THM WBVTR 2 By 16 7099 THM WBVTR 2 By 16 7091 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7098 THM WBVTR 2 By 17 7099 THM WBVTR 2 By 16 7090 THM WBVTR 2 By 16 7091 THM WBVTR 2 By 16 7091 THM WBVTR 2 By 16 7091 THM WBVTR 2 By 16 7091 THM WBVTR 3 By 7097 THM WBVTR 3 By 7097 THM WBVTR 3 By 7097 THM WBVTR 3 By 7097 THM WBVTR 3 By 7098 THM WBVTR 3 By 7099 THM WBVTR 3 By 7090 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM WBVTR 3 By 7091 THM		DGC	21.67	21.49	23, 36	22, 12	20,90 15,82	20, 82	21,30
7040 7040 7040 7041 7041 7041 7041 7041		DGC	15,50	16, 28	15,14	15,81 22,00	21,58	16, 19 21, 52	15, 21 21, 44
7040 THM TH01 TCB 7041 THM TH02 TCB 7042 THM TH03 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH07 TCB 7048 THM TH11 TCB 7049 THM TH12 TCB 7050 THM TH12 TCB 7051 THM TH13 TCB 7052 THM TH14 TCB 7052 THM TH15 TCB 7053 THM TH15 TCB 7060 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 2 7063 THM Shutter By 3 7063 THM Shutter By 4 7064 THM Shutter By 4 7065 THM Shutter By 9 7067 THM Shutter By 9 7068 THM Shutter By 1 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 18 7086 THM Q1 T Zener V 7081 THM Q2 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7083 THM Q3 T Zener V 7084 THM Q3 S Zener V 7085 THM WB T Zener V 7086 THM WB T Zener V 7087 THM Shutter By 19 7090 THM Shutter By 17 7091 THM Shutter By 17 7091 THM Shutter By 19 7092 THM WB T Zener V 7093 THM Q3 T Zener V 7095 THM WB T Zener V 7096 THM WB T Zener V 7097 THM WB T Zener V 7098 THM WB T R Sep 1 7099 THM WB T R Sep 1 7099 THM WB T R Sep 1 7099 THM WB T R Sep 1 7099 THM WB T R Sep 1 7099 THM WB T R Sep 1 7091 THM WB T R Sep 1 7097 THM WB T R Sep 1 7098 THM WB T R Sep 1 7099 THM WB T R Sep 6 7090 THM WB T R Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 1 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6 7090 THM MBTR B Sep 6		DGC DGC	23,05	21,70 19,32	24,59	19.50	18,90	18,80	19,05
7041 THM TH02 TCB 7042 THM TH03 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7046 THM TH05 TCB 7046 THM TH07 TCB 7046 THM TH09 TCB 7047 THM TH19 TCB 7048 THM TH11 TCB 7050 THM TH12 TCB 7051 THM TH14 TCB 7052 THM TH13 TCB 7052 THM TH14 TCB 7053 THM TH14 TCB 7053 THM TH14 TCB 7054 THM TH18 TCB 7056 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 3 7063 THM Shutter By 5 7064 THM Shutter By 5 7064 THM Shutter By 5 7065 THM Shutter By 1 7067 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7073 THM Shutter By 16 7075 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7077 THM Shutter By 18 7078 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q2 T Zener V 7084 THM Q2 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7087 THM SPN Mount 7091 THM MBVTR Rod Ct 7096 THM WBVTR Rod Ct 7097 THM WBVTR Rod Ct 7097 THM WBVTR Sep 1 7097 THM WBVTR Sep 1 7097 THM WBVTR 1 Cent 7097 THM WBVTR 1 Pay 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7098 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 3 By 7098 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 3 By 7098 THM WBVTR 2 By 16 7097 THM WBVTR 3 By 7098 THM WBVTR 3 By 7099 THM WBVTR 3 By 7097 THM WBVTR 3 By 7		DGC	19,53 19,42	19, 32	20,39 19,72	19,58	18,89	19, 01	18, 82
7042 THM TH03 TCB 7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH05 TCB 7046 THM TH05 TCB 7048 THM TH07 TCB 7048 THM TH10 TCB 7049 THM TH11 TCB 7050 THM TH12 TCB 7050 THM TH13 TCB 7051 THM TH14 TCB 7052 THM TH14 TCB 7053 THM TH16 TCB 7054 THM TH16 TCB 7054 THM TH16 TCB 7055 THM TH17 TCB 7060 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 2 7062 THM Shutter By 4 7064 THM Shutter By 4 7064 THM Shutter By 5 7065 THM Shutter By 9 7067 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 1 7072 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 15 7074 THM Shutter By 15 7074 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7077 THM Shutter By 17 7078 THM Q3 T Zener V 7081 THM Q3 S Zener V 7082 THM Q3 S Zener V 7084 THM Q3 S Zener V 7085 THM WBVTR Rad Ct 7090 THM PSM Mount 7091 THM WBVTR Rad Ct 7094 THM WBVTR Sep 17 7096 THM WBVTR Sep 17 7097 THM WB Mt Bay 1 7099 THM WBVTR Sep 17 7101 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7107 THM WBVTR 3 Sep 1 7107 THM WBVTR B Sep 6 7108 THM MBTR B Sep 6 7108 THM MBTR B Sep 6 7109 THM MBSM Mount 14 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MOUNT 17 7109 THM MSM MSM MSM MM MM MM MM MM MM MM MM MM		DGC	19.42 17.55	19, 78	19.72	17.74	17, 33	17, 49	17.06
7043 THM TH04 TCB 7044 THM TH05 TCB 7045 THM TH07 TCB 7046 THM TH07 TCB 7048 THM TH07 TCB 7049 THM TH11 TCB 7050 THM TH12 TCB 7051 THM TH13 TCB 7052 THM TH14 TCB 7052 THM TH15 TCB 7053 THM TH15 TCB 7054 THM TH16 TCB 7056 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 4 7064 THM Shutter By 5 7065 THM Shutter By 9 7067 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 15 7074 THM Shutter By 18 7075 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7081 THM Q1 T Zener V 7082 THM Q2 S Zener V 7084 THM Q2 S Zener V 7085 THM Q3 S Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM WB NT Red Ct 7090 THM WBVTR Red 7091 THM WBVTR Red 7097 THM WB Mt Bay 1 7098 THM WBVTR Sep 3 7100 THM WBVTR Sep 3 7100 THM WBVTR 1 Cent 7101 THM WBVTR 2 By 15 7104 THM WBVTR 2 By 15 7107 THM WBVTR 2 By 15 7107 THM WBVTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MBTR B Sep 6 7108 THM MBS Mount 14 7109 THM MS M MS MOUNT 17 7109 THM MBS MOUNT 17 7109 THM MBTR B Sep 6 7100 THM MBTR B Sep 6 7101 THM MBTR B Sep 6 7101 THM MBTR B Sep 6 7101 THM MBTR B Sep 6 7101 THM MBS Mount 14 7109 THM MS M MS MOUNT 17 7109 THM MBS MOUNT 17 7109 THM MBS MOUNT 14 7109 THM		DGC	16. 85	18, 23	16.32	17.40	17,69	18,59	16.37
7044 THM TH05 TCB 7046 THM TH07 TCB 7046 THM TH07 TCB 7046 THM TH07 TCB 7047 THM TH11 TCB 7050 THM TH11 TCB 7051 THM TH12 TCB 7052 THM TH13 TCB 7052 THM TH14 TCB 7053 THM TH14 TCB 7064 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 3 7064 THM Shutter By 5 7065 THM Shutter By 7 7067 THM Shutter By 7 7067 THM Shutter By 10 7070 THM Shutter By 11 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7074 THM Shutter By 16 7075 THM Shutter By 16 7076 THM Shutter By 17 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7077 THM Shutter By 18 7076 THM Shutter By 18 7076 THM Shutter By 18 7077 THM Shutter By 18 7078 THM Q2 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 S Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM WB YR Rod Ct 7097 THM WB WB Ray 1 7099 THM WB WB WB Ray 1 7099 THM WB WB TR Rep 3 7110 THM WB WB TR Sep 3 7110 THM WB WB TR Sep 1 7101 THM WB WB TR B Sep 6 7110 THM NBTR B Sep 6 7110 THM MBTR B Sep 6 7101 THM MBTR B Sep 1		DGC	19.90	20, 05	19.33	19.73	19, 61	19.82	19, 21
7045 THM TH07 TCB 7046 THM TH09 TCB 7048 THM TH11 TCB 7049 THM TH12 TCB 7050 THM TH13 TCB 7051 THM TH13 TCB 7052 THM TH14 TCB 7052 THM TH14 TCB 7053 THM TH16 TCB 7054 THM TH16 TCB 7055 THM TH17 TCB 7064 THM Shutter By 1 7067 THM Shutter By 2 7068 THM Shutter By 4 7064 THM Shutter By 4 7064 THM Shutter By 7 7067 THM Shutter By 9 7068 THM Shutter By 1 7070 THM Shutter By 1 7071 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7072 THM Shutter By 15 7074 THM Shutter By 15 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7077 THM Shutter By 17 7078 THM Q3 T Zener V 7081 THM Q3 S Zener V 7082 THM Q3 S Zener V 7084 THM Q3 S Zener V 7085 THM WB X Radiator 7093 THM WBVTR Rad Ct 7094 THM WBVTR Rad Ct 7095 THM WB WB MB Bay 1 7099 THM WB WB MB Bay 1 7099 THM WB WB MB Bay 1 7099 THM WB WB TR Sep 1 7101 THM WBVTR 2 By 16 7102 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7107 THM WBVTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MBS Mount 14 7109 THM MS MOUNT 17 7109 THM MS MOUNT 17 7109 THM MS MOUNT 17 7109 THM MS MOUNT 17 7109 THM MS MOUNT 17 7109 THM MBTR B Sep 6 7100 THM MS MOUNT 17 7109 THM MS MOU		DGC	16,42	16, 21	15.75	15,94	15.73	15.75	15, 47
7046 THM TH09 TCB 7048 THM TH11 TCB 7049 THM TH12 TCB 7050 THM TH13 TCB 7051 THM TH13 TCB 7052 THM TH16 TCB 7052 THM TH16 TCB 7053 THM TH17 TCB 7054 THM SULTER By 1 7061 THM SAUTER By 1 7061 THM SAUTER By 2 7062 THM SAUTER By 2 7063 THM SAUTER By 3 7063 THM SAUTER By 5 7065 THM SAUTER By 5 7067 THM SAUTER By 1 7070 THM SAUTER By 1 7071 THM SAUTER By 12 7071 THM SAUTER By 12 7071 THM SAUTER By 13 7072 THM SAUTER By 13 7072 THM SAUTER By 15 7074 THM SAUTER By 16 7075 THM SAUTER By 18 7086 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 T Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7086 THM Q3 S Zener V 7087 THM W8 T Zener V 7088 THM W8 T Zener V 7088 THM W8 T Zener V 7089 THM W8 T Zener V 7080 THM W8 T Zener V 7081 THM W8 T Zener V 7082 THM W8 T Zener V 7084 THM W8 T Zener V 7085 THM W8 T Zener V 7086 THM W8 T Zener V 7087 THM W8 T Zener V 7088 THM W8 T Zener V 7089 THM W8 T Zener V 7091 THM W8 T Red Ct 7090 THM W8 T Red Ct 7091 THM W8 T Strap 7097 THM W8 T Sep 1 7101 THM W8 T Z EN 7097 THM W8 T Sep 1 7101 THM W8 T R Sep 1 7102 THM W8 T R Sep 1 7104 THM W8 T R Sep 1 7107 THM W8 T R Sep 1 7107 THM W8 T R Sep 1 7108 THM W8 T R Sep 1 7107 THM W8 T R Sep 1 7108 THM W8 T R Sep 6 7106 THM NBTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MS MOUNT 14 7109 THM MS MOUNT 14 7109		DGC	17, 76	18, 12	17, 33	17,52	17.97	15,00	17.64
7048 THM THIL TCB 7049 THM THIL TCB 7050 THM THIL TCB 7051 THM THIL TCB 7052 THM THIL TCB 7052 THM THIL TCB 7053 THM THIL TCB 7054 THM THIL TCB 7056 THM THIL TCB 7060 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 3 7063 THM Shutter By 5 7065 THM Shutter By 7 7067 THM Shutter By 1 7067 THM Shutter By 10 7070 THM Shutter By 11 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7073 THM Shutter By 16 7075 THM Shutter By 16 7076 THM Shutter By 17 7076 THM Shutter By 17 7077 THM Shutter By 18 7081 THM Q1 T Zener V 7082 THM Q2 T Zener V 7082 THM Q2 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7087 THM BV Radiator 7091 THM BV Radiator 7091 THM BV Radiator 7092 THM RBV Ctr Bm 7094 THM WBVTR Rod Ct 7096 THM WBVTR Rad Ct 7097 THM WB Mat Bay 1 7098 THM WBVTR Sep 17 7097 THM WBVTR Sep 17 7097 THM WBVTR 1 Cent 7100 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 17 7101 THM WBVTR 2 By 16 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 7 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 6 7101 THM WBVTR 3 By 7 7101 THM WBVTR 3 By 6 7 701 THM WBVTR 3 By 6 7 7		DGC	19.30	19.31	18.81	18.71	18,81	18, 69	18, 83
7050 THM TH13 TCB 7051 THM TH14 TCB 7052 THM TH16 TCB 7053 THM TH16 TCB 7054 THM TH16 TCB 7056 THM TH17 TCB 7060 THM SAUTOR By 1 7061 THM SAUTOR By 2 7062 THM SAUTOR By 2 7063 THM SAUTOR By 3 7064 THM SAUTOR By 5 7065 THM SAUTOR By 5 7067 THM SAUTOR By 9 7069 THM SAUTOR By 10 7070 THM SAUTOR By 12 7071 THM SAUTOR By 12 7071 THM SAUTOR By 12 7071 THM SAUTOR By 13 7072 THM SAUTOR By 16 7073 THM SAUTOR By 15 7074 THM SAUTOR By 18 7075 THM SAUTOR By 18 7076 THM SAUTOR By 18 7076 THM SAUTOR By 18 7077 THM SAUTOR By 18 7081 THM Q1 T Zener V 7082 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q2 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7087 THM BY RADIATOR 7091 THM MBV RADIATOR 7091 THM MBVTR RAD 7092 THM WBVTR RAD 7093 THM WBVTR RAD 7094 THM WBVTR RAD 7095 THM WBVTR RAD 7096 THM WBVTR Sep 17 7109 THM WBVTR 2 By 15 7101 THM WBVTR 2 By 16 7102 THM WBVTR 2 By 17 7104 THM WBVTR 2 By 17 7105 THM WBVTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MBTR B Sep 6 7108 THM MBTR B Sep 6 7109 THM MBTR B Sep 6 7109 THM MBTR B Sep 6 7100 THM MBTR B Sep 6 7100 THM MBTR B Sep 6 7100 THM MBTR B Sep 6 7100 THM MBTR B Sep 6 7100 THM MBTR B Sep 6 7100 THM MBTR B Sep 6 7100 THM MBTR B Sep 6 7100 THM MBTR B Sep 1 7101 THM MBTR B Sep 6	THM THIL TCB	DGC	23, 27	22,43	23,74	22.25	22, 17	22.06	22.07
7051 THM TH14 TCB 7052 THM TH16 TCB 7053 THM TH16 TCB 7053 THM TH18 TCB 7060 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 3 7063 THM Shutter By 5 7065 THM Shutter By 7 7067 THM Shutter By 1 7070 THM Shutter By 10 7070 THM Shutter By 11 7071 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 16 7073 THM Shutter By 16 7073 THM Shutter By 16 7074 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 18 7081 THM Q1 T Zener V 7082 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q2 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7087 THM BV Radiator 7091 THM BW Radiator 7091 THM WBVTR Rod Ct 7092 THM WBVTR Rod Ct 7095 THM WBVTR Rad Ct 7096 THM WBVTR Sep 17 7097 THM WB Mat Bay 1 7098 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 17 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 2 By 16 7097 THM WBVTR 3 By 7 7098 THM WBVTR 2 By 16 7097 THM WBVTR 3 By 7 7097 THM WBVTR 3 By 7 7098 THM WBVTR 3 By 7 7098 THM WBVTR 3 By 7 7099 THM WBVTR 3 By 6 7098 THM WBVTR 3 By 6 7098 THM WBVTR 3 By 6 7098 THM WBVTR 3 By 6 7098 THM WBVTR 3 By 6 7098 THM WBVTR 3 By 6 7098 THM WBVTR 3 By 6 7098 THM WBVTR 3 By 7 7099 THM WBVTR 3 By 7 7099 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM WBVTR 3 By 7 7090 THM MBVTR 3 By 7 7090 THM MBVTR 3 By 7 7090 THM MBVTR 3 By 7 7090 THM MBVTR 3 By 7 7090 THM MBVTR 3 By 7 7090 THM MBVTR 3 By 7 7090 THM MBVTR 3 By 7 7090 THM MBVTR 3 By 7 7090 THM MBVTR 3 By 7 7090 THM M	THM TH12 TCB	DGC	23,04	20, 62	23, 94	20.85	20, 19	20, 38	20.34
7052 THM TH16 TCB 7053 THM TH17 TCB 7054 THM TH18 TCB 7060 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 4 7064 THM Shutter By 4 7064 THM Shutter By 5 7067 THM Shutter By 9 7067 THM Shutter By 10 7069 THM Shutter By 11 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7072 THM Shutter By 16 7073 THM Shutter By 16 7074 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 18 7080 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q2 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7090 THM PSM Mount 7091 THM WBVTR Radlator 7092 THM WBVTR Rad Ct 7093 THM WBVTR Rad Ct 7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7098 THM WBVTR Sep 3 7100 THM WBVTR 2 Bay 7101 THM WBVTR 2 Bay 7102 THM WBVTR 2 Bay 7103 THM WBVTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM NBTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MBSM MOUNT 14 7109 THM MSS MOUNT 14 7109 THM MSS MOUNT 14 7109 THM MSS MOUNT 14 7109 THM MS M MD MT THM MBTR B SEP 6 7106 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7108 THM MSS MOUNT 14 7109 THM MSS MOUNT 14 7109 THM MSS MOUNT 14 7109 THM MSS MOUNT 14 7109 THM MSS MOUNT 14 7109 THM OA - Y Thruster	тим тиз тсв	DGC	22, 89	20, 34	24,67	20,76	20.46	20, 35	20,46
7053 THM TH17 TCB 7054 THM S118 TCB 7060 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 5 7063 THM Shutter By 5 7064 THM Shutter By 7 7067 THM Shutter By 7 7067 THM Shutter By 1 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7072 THM Shutter By 15 7074 THM Shutter By 15 7075 THM Shutter By 16 7075 THM Shutter By 18 7086 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 T Zener V 7085 THM Q3 T Zener V 7086 THM Q3 S Zener V 7086 THM Q3 S Zener V 7087 THM Q4 S Zener V 7088 THM Q5 T Zener V 7089 THM W8 T Zener V 7080 THM W8 T Zener V 7081 THM Q5 T Zener V 7082 THM Q6 T Zener V 7084 THM Q7 T Zener V 7085 THM Q8 T Zener V 7086 THM W8 T Zener V 7096 THM W8 T Zener V 7097 THM W8 TR Root 7091 THM W8 TR Root 7092 THM W8 TR Root 7093 THM W8 TR Sep 3 7100 THM W8 TR Sep 3 7100 THM W8 TR Sep 3 7101 THM W8 TR Sep 3 7101 THM W8 TR B Sep 1 7107 THM NBTR B Sep 6 7108 THM NBTR B Sep 6 7108 THM NBTR B Sep 6 7107 THM NBTR B Sep 6 7108 THM MS SMOUNT 14 7109 THM SMOUNT 14 7109 THM MS SMOUNT 14 7109 THM MS		DGC	25.07	22, 11	27,69	22,92	22,11	21,88	22,22
7054 THM Shutter By 1 7061 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 3 7064 THM Shutter By 5 7065 THM Shutter By 7 7067 THM Shutter By 7 7067 THM Shutter By 10 7069 THM Shutter By 11 7070 THM Shutter By 11 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 14 7073 THM Shutter By 16 7073 THM Shutter By 16 7074 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 18 7081 THM Q1 T Zener V 7082 THM Q2 T Zener V 7082 THM Q2 T Zener V 7084 THM Q2 S Zener V 7085 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7087 THM BV S Zener V 7089 THM PSN Mount 7091 THM MBVTR Rod 7092 THM MBVTR Rod 7093 THM WBVTR Rod 7094 THM WBVTR Strap 7095 THM WBVTR Sep 17 7097 THM WB MB Bay 1 7098 THM WBVTR 1 Cent 7100 THM WBVTR 1 Cent 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR 2 By 16 7101 THM WBVTR B Sep 6 7101 THM MBTR B Sep 6 7101 THM MBTR B Sep 6 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 6 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 1 7101 THM MBTR B Sep 1 7102 THM MBTR B Sep 1 7103 THM MBTR B Sep 1 7104 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7108 THM MBTR B Sep 1 7109 THM MBTR B Sep 1		DGC	22, 22	21,59	24, 29	22.32	21.24	21, 24	20, 64
7061 THM Shutter By 1 7062 THM Shutter By 2 7063 THM Shutter By 4 7064 THM Shutter By 4 7064 THM Shutter By 5 7065 THM Shutter By 7 7067 THM Shutter By 9 7067 THM Shutter By 9 7068 THM Shutter By 10 7070 THM Shutter By 11 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7072 THM Shutter By 14 7073 THM Shutter By 15 7074 THM Shutter By 15 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Q3 T Zener V 7081 THM Q3 T Zener V 7082 THM Q3 S Zener V 7084 THM Q3 S Zener V 7084 THM Q3 S Zener V 7090 THM PSM Mount 7091 THM WBVTR Rad Ct 7093 THM WBVTR Rad Ct 7094 THM WBVTR Strap 7095 THM WB Mt Bay 1 7096 THM WB WTR Sep 3 7100 THM WBVTR Sep 3 7100 THM WBVTR Sep 17 7101 THM WBVTR 2 By 16 7102 THM WBVTR 2 By 16 7104 THM WBVTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MBS Mount 14 7109 THM MSS Mount 14 7109 THM MSS Mount 17 7109 THM MSS Mount 17 7109 THM MSS Mount 14 7109 THM MSS MOUNT 14 7109 THM MSS		DGC	23,52	22, 79	24.86	23.31	22,05	21, 91	22,53
7061 THM Shutter By 2 7062 THM Shutter By 3 7063 THM Shutter By 5 7063 THM Shutter By 5 7065 THM Shutter By 5 7067 THM Shutter By 9 7068 THM Shutter By 9 7069 THM Shutter By 10 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7073 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 18 7086 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7087 THM W8 TA Red 7091 THM W8 TA Red 7092 THM W8 TR Red 7093 THM W8 TR Red 7094 THM W8 TR Red 7095 THM W8 TR Strap 7097 THM W8 Mt Bay 1 7098 THM W8 TR Sep 3 7100 THM W8 TR Sep 3 7100 THM W8 TR Sep 1 7101 THM W8 TR 2 By 16 7102 THM W8 TR 2 By 16 7104 THM W8 TR B Sep 1 7107 THM W8 TR B Sep 6 7108 THM NBTR B Sep 6 7108 THM NBTR B Sep 6 7108 THM MSS Mount 14 7109 THM MSS Mount 14 7109 THM MSS Mount 14 7109 THM MSS Mount 14 7109 THM MSS Mount 14 7109 THM MSS Mount 14 7109 THM MSS Mount 14 7109 THM MSS MOUNT 14 7109 TH		DGC	20.01	20.05	20.99	20,83	19.74	19,66	20,27
7063 THM Shutter By 3 7064 THM Shutter By 4 7065 THM Shutter By 7 7067 THM Shutter By 7 7067 THM Shutter By 9 7067 THM Shutter By 10 7069 THM Shutter By 10 7070 THM Shutter By 11 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7073 THM Shutter By 14 7073 THM Shutter By 16 7074 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7077 THM Shutter By 17 7081 THM Q1 T Zener V 7082 THM Q2 T Zener V 7083 THM Q2 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7087 THM PSN Mount 7091 THM RBV Radiator 7092 THM PSN Mount 7092 THM WBVTR Rod Ct 7095 THM WBVTR Rod Ct 7096 THM WBVTR Sep 17 7097 THM WBVTR Sep 17 7097 THM WBVTR Sep 17 7101 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7105 THM WBVTR 2 By 16 7106 THM NBTR B Sep 6 7110 THM NBTR B Sep 6 7110 THM NBTR B Sep 6 7110 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7108 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7108 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7108 THM MBTR B Sep 1 7109 THM THM THM THM THM THM THM THM THM THM		DEC	22.54	24, 43	26,65	22,56	15, 51	16, 29	15, 42
7063 THM Shutter By 4 7064 THM Shutter By 5 7065 THM Shutter By 9 7067 THM Shutter By 9 7067 THM Shutter By 9 7069 THM Shutter By 10 7070 THM Shutter By 11 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 15 7074 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7077 THM Shutter By 18 7080 THM Q1 T Zener V 7081 THM Q2 T Zener V 7081 THM Q3 T Zener V 7084 THM Q3 S Zener V 7064 THM Q3 S Zener V 7065 THM BY RAdiator 7090 THM PSM Mount 7091 THM WBVTR Root 7091 THM WBVTR Root 7093 THM WBVTR Strap 7094 THM WBVTR Strap 7095 THM WB Mt Bay 1 7096 THM WBVTR Sep 3 7100 THM WBVTR Sep 3 7101 THM WBVTR 2 By 16 7102 THM WBVTR 2 By 16 7104 THM WBVTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM NBTR B Sep 6 7108 THM MBTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MSS Mount 14 7109 THM MSS MOUNT 14 7109 THM MSS MOUNT		TeG FRRS	19.34	24, 75	21, 13	21,82	17,80 25,26	16.45 31.72	17, 50
7064 THM Shutter By 5 7067 THM Shutter By 7 7067 THM Shutter By 7 7068 THM Shutter By 10 7069 THM Shutter By 11 7070 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7072 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 16 7076 THM Shutter By 17 7076 THM Shutter By 18 7081 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7097 THM RBV Rddiator 7091 THM RBV Rddiator 7091 THM WBVTR Root 7092 THM WBVTR Root 7095 THM WBVTR Root 7095 THM WBVTR Strap 7097 THM WB Mt Bay 1 7098 THM WBVTR Sep 37 7100 THM WBVTR Sep 37 7101 THM WBVTR 2 By 16 7102 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7105 THM WBVTR B Sep 6 71M NBTR B Sep 6 71M NBTR B Sep 6 71M MBTR B Sep 6 71M MBS Mount 14 7109 THM MS MOUNT 17 7108 THM MSS Mount 14 7109 THM MSS MOUNT 14 7109 THM MSS M		DEG	22,75	31, 67	11,99	23.52			12,70
7065 THM Shutter By 7 7067 THM Shutter By 9 7069 THM Shutter By 10 7069 THM Shutter By 11 7070 THM Shutter By 11 7071 THM Shutter By 12 7071 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 14 7073 THM Shutter By 15 7074 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 17 7080 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 T Zener V 7084 THM Q3 S Zener V 7084 THM Q3 S Zener V 7090 THM PSM Mount 7091 THM RBV Radiator 7092 THM RBV Radiator 7093 THM RBV Radiator 7094 THM WBVTR Root 7095 THM WBVTR Root 7096 THM WBVTR Sep 3 7097 THM WB Mt Bay 1 7098 THM WB Mt Bay 1 7099 THM WB Mt Bay 1 7099 THM WB Mt Bay 1 7099 THM WBVTR Sep 3 7100 THM WBVTR 2 Bay 7101 THM WBVTR 2 Bay 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 Bay 7104 THM WBVTR 2 Bey 7105 THM WBVTR 2 Bey 7106 THM NBTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM NBTR B Sep 1 7107 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7108 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7108 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7102 THM MBTR B SEP 1 7103 THM MBTR B SEP 1 7104 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7108 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7100 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7102 THM MBTR B SEP 1 7103 THM MBTR B SEP 1 7104 THM MBTR B SEP 1 7105 THM MBTR B SEP 1 7106 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7108 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR		DEG	33,89	36, 32	33,00	33, 16 2, 89	33, 19 2, 93	32, 93	11.02
7,68 7 THM Shutter By 9 7,68 7 THM Shutter By 10 7069 7 THM Shutter By 11 7070 7 THM Shutter By 12 7071 7 THM Shutter By 12 7071 7 THM Shutter By 13 7072 7 THM Shutter By 15 7074 7 THM Shutter By 15 7074 7 THM Shutter By 15 7076 7 THM Shutter By 17 7076 7 THM Shutter By 17 7076 7 THM Shutter By 17 7076 7 THM Q1 T Zener V 7081 7 THM Q2 T Zener V 7082 7 THM Q3 T Zener V 7084 7 THM Q3 S Zener V 7085 7 THM Q3 S Zener V 7090 7 THM PSM Mount 7091 7 THM RBV Radiator 7092 7 THM RBV Radiator 7093 7 THM WBVTR Root 7094 7 THM WBVTR Root 7095 7 THM WBVTR Strap 7097 7 THM WB Mt Bay 1 7099 7 THM WBVTR Sep 3 7100 7 THM WBVTR Sep 17 7101 7 THM WBVTR 2 By 15 7104 7 THM WBVTR 2 By 15 7 THM WBVTR 2 By 16 7 THM WBVTR 2 By 16 7 THM WBVTR 2 By 16 7 THM WBVTR 2 Sep 6 7 THM WBVTR 2 Sep 6 7 THM WBVTR B Sep 6 7 THM NBTR B Sep 6 7 THM NBTR B Sep 6 7 THM MBTR B Sep 1 7 THM MBTR B Sep 1 7 THM MBTR B Sep 1 7 THM MBTR B Sep 1 7 THM MBTR B SEP		DEG DEG	7,50 17,06	8, 67 22, 52	2,90 11,11	13,64	2, 93 19, 52	2, 93 16, 75	2,88 18,98
7.688 THM Shutter By 10 7069 THM Shutter By 11 7070 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7072 THM Shutter By 15 7074 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 16 7076 THM Shutter By 18 7086 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7085 THM Q3 S Zener V 7096 THM PSM Mount 7091 THM MB VR Radiator 7091 THM MB VR Radiator 7092 THM WBVTR Rod 7092 THM WBVTR Rod 7095 THM WBVTR Rad Ct 711M WBVTR Rad Ct 711M WBVTR Sep 3 7100 THM WBVTR Sep 3 7110 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7105 THM WBVTR 2 By 16 7106 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7108 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR B Sep 6 711M WBVTR B Sep 6 71M NBTR B Sep 6 71M MBTR B Sep 6 71M MBTR B Sep 6 71M MBTR B Sep 6 71M MBTR B Sep 6 71M MBTR B Sep 6 71M MBTR B Sep 6 71M MBTR B Sep 6 71M MBTR B Sep 6 71M MBTR B SEP 6		DEG	33.75	38, 22	34, 12	32,97	34.23	34.19	33.75
7060 THM Shutter By 11 7070 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7072 THM Shutter By 14 7073 THM Shutter By 15 7074 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 18 7086 THM Q1 T Zener V 7081 THM Q2 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q2 S Zener V 7085 THM Q3 S Zener V 7096 THM PSM Mount 7090 THM PSM Mount 7091 THM RBV Radiator 7092 THM RBV Radiator 7093 THM RBV Radiator 7094 THM WBVTR Root 7095 THM WBVTR Root 7096 THM WBVTR Sep 3 7097 THM WB Mt Bay 1 7098 THM WB Mt Bay 1 7099 THM WB WTR Sep 3 7100 THM WBVTR 2 Bay 7101 THM WBVTR 2 Bay 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 Bay 7104 THM WBVTR 2 By 16 7105 THM WBVTR 2 Boy 7106 THM WBVTR 2 Boy 7107 THM WBVTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7108 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7108 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7108 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7101 THM MBTR B SEP 1 7102 THM MBTR B SEP 1 7103 THM MBTR B SEP 1 7104 THM MBTR B SEP 1 7105 THM MBTR B SEP 1 7107 THM MBTR B SEP 1 7108 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM MBTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP 1 7109 THM BTR B SEP		DEG	37.46	34, 96	37.09	32,71	33, 91	33, 40	33, 32
7070 THM Shutter By 12 7071 THM Shutter By 13 7072 THM Shutter By 13 7073 THM Shutter By 15 7074 THM Shutter By 15 7075 THM Shutter By 16 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 17 7078 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7083 THM Q3 S Zener V 7084 THM Q3 S Zener V 7090 THM PSM Mount 7091 THM RBV Radiator 7092 THM RBV Radiator 7093 THM WBVTR Rad Ct 7094 THM WBVTR Rad Ct 7095 THM WBVTR Strap 7097 THM WB Mt Bay 1 7098 THM WBVTR Sep 3 7100 THM WBVTR Sep 3 7101 THM WBVTR Sep 17 7101 THM WBVTR 2 By 16 7102 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7105 THM WBVTR 2 By 16 7106 THM NBTR B Sep 6 7107 THM NBTR B Sep 6 7108 THM MBTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MBTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MBTR B Sep 6 7107 THM MBTR B SEP 6 7108 THM MBTR B		DEG	52,25	10.16	17, 39	8.74	1.36	0.50	3,29
7071 THM Shutter By 13 7072 THM Shutter By 14 7073 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 16 7076 THM Shutter By 17 7076 THM Shutter By 17 7076 THM Shutter By 18 7081 THM Q1 T Zener V 7082 THM Q2 T Zener V 7083 THM Q2 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7085 THM Q3 S Zener V 7085 THM Q3 S Zener V 7090 THM PSM Mount 7091 THM Ind Attitude 7092 THM RBV Radiator 7093 THM RBV Radiator 7094 THM WBVTR Rod Ct 7095 THM WBVTR Rod Ct 7096 THM WBVTR Strap 7097 THM WB WB Bay 1 7098 THM WBVTR Sep 17 7101 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7105 THM WBVTR 2 By 16 7106 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBTR B Sep 6 7108 THM NBTR B Sep 6 7107 THM NBTR B Sep 1 7107 THM MBTR B Be 1 7107 THM MBTR B Be 1 7107 THM MBTR B Be 1 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DEG	61,38	46, 20	67, 16	48.10	16, 14	45.49	45, 57
7072 (THM Shutter By 14 7073 THM Shutter By 15 7074 THM Shutter By 16 7075 THM Shutter By 17 7086 THM Shutter By 17 7081 THM Shutter By 17 7082 THM Q1 T Zener V 7081 THM Q2 T Zener V 7083 THM Q2 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7086 THM PSN Mount 7091 THM PSN Mount 7091 THM BV Radiator 7092 THM RBV Radiator 7093 THM RBV Radiator 7093 THM WBVTR Root 7094 THM WBVTR Root 7095 THM WBVTR Root 7096 THM WBVTR Sep 3 7100 THM WB Mt Bay 1 7098 THM WB Mt Bay 1 7099 THM WB TR Sep 3 7100 THM WBVTR 2 Bay 7101 THM WBVTR 2 Bay 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 Bay 7104 THM WBVTR 2 By 16 7105 THM WBVTR 2 Bop 7106 THM WBVTR 2 Bop 7107 THM WBVTR 2 Bop 7107 THM WBVTR 2 Bop 7108 THM WBVTR 2 Bop 7107 THM NBTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM NBTR B TH 7108 THM MSS Mount 14 7109 THM MOA - Y Thruster		DEG	63,60	45, 76	74.14	50,24	47,73	46, 36	47.85
7074 THM Shutter By 16 7075 THM Shutter By 17 7076 THM Shutter By 17 7082 THM Q1 T Zener V 7082 THM Q2 T Zener V 7083 THM Q1 T Zener V 7084 THM Q2 T Zener V 7085 THM Q1 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7090 THM PSM Mount 7091 THM BY SAN MOUNT 7091 THM BV Radiator 7092 THM BV Radiator 7093 THM RBV Ctr Bm 7094 THM WBVTR Rod Ct 7095 THM WBVTR Rad Ct 7096 THM WBVTR Strap 7097 THM WB WB TR 7097 THM WB WB TR 7098 THM WBVTR Sep 17 7101 THM WBVTR 1 Cent 7102 THM WBVTR 1 Cent 7104 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBVTR 2 By 16 7107 THM WBTR B Sep 6 7108 THM NBTR B Sep 6 7108 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7107 THM MBTR B Sep 1 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DEC	59.44	40,40	72,14	45,11	20, 93	37.70	40, 22
7075 THM Shutter By 17 7076 THM Shutter By 18 7086 THM Q1 T Zener V 7081 THM Q2 T Zener V 7082 THM Q1 T Zener V 7083 THM Q1 S Zener V 7084 THM Q2 S Zener V 7085 THM Q2 S Zener V 7086 THM Q3 S Zener V 7090 THM PSM Mount 7091 THM BV Radiator 7092 THM RBV Radiator 7093 THM RBV Radiator 7093 THM WBVTR Root 7094 THM WBVTR Root 7095 THM WBVTR Rad Ct 7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7096 THM WB Mt Bay 1 7097 THM WB Mt Bay 1 7098 THM WBVTR Sep 17 7101 THM WBVTR 2 Bay 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 7104 THM WBVTR 2 By 7105 THM WBVTR 2 By 7106 THM NBVTR 2 Bey 7107 THM NBVTR B Sep 6 7106 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B SEP 1 7108 THM NBTR B SEP 1 7107 THM NBTR B SEP 1 7108 THM NBTR B SEP 1 7107 THM NBTR B SEP 1 7108 THM NBTR B SEP 1 7107 THM NBTR B SEP 1 7108 THM NBTR B SEP 1 7107 THM NBTR B SEP 1 7108 THM NBTR B SEP 1 7109 THM NBTR B SEP 1 7107 THM NBTR B SEP 1 7108 THM NBTR B SEP 1 7109 THM B THM STR B SEP 1 7109 THM B THM STR B SEP 1 7109 THM B THM STR B SEP 1 710	THM Shutter By 15	DEG	67,79	53.78	82, 12	62.35	56, 16	53.70	- 48,58
7086 THM Shutter By 18 7082 THM Q1 T Zener V 7082 THM Q2 T Zener V 7083 THM Q3 T Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7085 THM Q3 S Zener V 7090 THM PSM Mount 7091 THM Ind Attitude 7092 THM RBV Radiator 7093 THM RBV Ctr Bm 7094 THM WBVTR Root 7095 THM WBVTR Rad Ct 7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7099 THM WB VTR Sep 3 7100 THM WBVTR Sep 17 7101 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 15 7104 THM WBVTR 2 By 15 7105 THM WBVTR 2 By 16 7106 THM NBTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM MBTR B Sep 6 7108 THM MBSM MOUNT 14 7109 THM MSS MOUNT 14 7109 THM MS M MSS MOUNT 14 7109 THM MS T Thruster		DEG	45.20	43.68	61,13	49,30	41,77	41.43	36, 55
7081 THM Q1 T Zener V 7082 THM Q2 T Zener V 7082 THM Q2 T Zener V 7083 THM Q1 S Zener V 7084 THM Q2 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7087 THM Q3 S Zener V 7090 THM PSM Mount 7091 THM RBV Radiator 7092 THM RBV Radiator 7093 THM RBVC Ctr Bm 7094 THM WBVTR Rod Ct 7095 THM WBVTR Rod Ct 7096 THM WBVTR Sep 17 7097 THM WB WB Bay 1 7098 THM WBVTR Sep 3 7100 THM WBVTR Sep 3 7101 THM WBVTR 1 Cent 7102 THM WBVTR 2 By 16 7104 THM WBVTR 2 By 16 7105 THM WBVTR 2 By 16 7106 THM NBTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM NBTR B Sep 6 7108 THM MBSM MOUNT 14 7109 THM MSS MOUNT 14 710		DEG	57, 88	52, 10	67.62	55,58	46.18	44, 72	50.12
7081 THM Q2 T Zener V 7082 THM Q3 T Zener V 7084 THM Q3 S Zener V 7084 THM Q3 S Zener V 7085 THM Q3 S Zener V 7086 THM Q3 S Zener V 7090 THM PSN Mount 7091 THM Ind Attitude 7092 THM RBV Radiator 7093 THM RBV Radiator 7094 THM WBVTR Root 7095 THM WBVTR Root 7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7098 THM WB Mt Bay 1 7099 THM WB VTR Sep 3 7100 THM WBVTR Sep 17 7101 THM WBVTR 2 Bay 7103 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 7104 THM WBVTR 2 By 7105 THM WBVTR 2 By 7106 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7109 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7109 THM NBTR B SEP 1 7107 THM NBTR B SEP 1 7108 THM NBTR B SEP 1 7109 THM NBTR B SEP 1 7107 THM NBTR B SEP 1 7108 THM NBTR B SEP 1 7109 THM B THM NBT		DEG	40.49	39, 32	45, 84	44, 18	36, 89	36,00	40.47
7082 THM Q3 T Zener V 7084 THM Q1 S Zener V 7085 THM Q2 S Zener V 7086 THM Q3 S Zener V 7090 THM PSM MOUNT 7091 THM IND Affittide 7092 THM RBV Radiator 7093 THM RBV RADIATOR 7095 THM WBVTR Rod 7096 THM WBVTR RAD CT 7097 THM WB WB TR Strap 7097 THM WB Mt Bay 1 7098 THM WBVTR Sep 3 7100 THM WBVTR Sep 3 7101 THM WBVTR 2 By 15 7104 THM WBVTR 2 By 15 7105 THM WBVTR 2 By 15 7106 THM WBVTR 2 Ctr 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 6 7106 THM NBTR B Sep 6 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7109 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7109 THM NBTR B Sep 1		VDC	4, 85	4, 85	4,85	4.85	4,85	4, 55	4,85
7083 THM Q1 S Zener V 7084 THM Q2 S Zener V 7085 THM Q2 S Zener V 7090 THM Q2 S Zener V 7090 THM PSM Mount 7091 THM Ind Attitude 7092 THM RBV Radiator 7093 THM RBV C Ctr Bm 7094 THM WBVTR Root 7095 THM WBVTR Root 7096 THM WBVTR Rad Ct 7097 THM WBVTR Rad Ct 7097 THM WB WTR Strap 7097 THM WB Mt Bay 1 7098 THM WB MT Sep 3 7100 THM WBVTR Sep 3 7100 THM WBVTR Sep 17 7101 THM WBVTR 2 Bay 7103 THM WBVTR 2 Bay 7103 THM WBVTR 2 Ex 7104 THM WBVTR 2 Sep 16 7105 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM NBTR B Sep 1 7109 THM NBTR B MD CT 7108 THM NBTR B MD CT 7108 THM NBTR B MD CT 7109 THM NBTR B MD CT 7108 THM NBTR B MD CT 7108 THM NBTR B MD CT 7109 THM NBTR B MD CT 7108 THM NBTR B MD CT 7108 THM NBTR B MD CT 7108 THM NBTR BM CT 7109 THM NBT THM CT 7109 THM NBT THM CT 7109 THM NBT THM CT 7109 THM NBT THM THM THM THM THM THM THM THM THM TH		VDC	4.90	4.90	4.90 5.05	4,90 5,04	1,90	4.90	4.90
7084 THM Q2 S Zener V 7085 THM Q3 S Zener V 7080 THM PSN Mount 7091 THM PSN Mount 7091 THM RBV Radiator 7092 THM RBV Ctr Bm 7094 THM WBVTR Root 7095 THM WBVTR Root 7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7098 THM WB Mt Bay 1 7099 THM WB VTR Sep 3 7100 THM WBVTR Sep 17 7101 THM WBVTR 1 Cent 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 Bay 7104 THM WBVTR 2 By 7105 THM WBVTR 2 Eq 7106 THM NBVTR 2 Eq 7107 THM NBVTR 8 Sep 6 7106 THM NBVTR 8 Sep 1 7107 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR B MOUNT 14 7109 THM MS MOUNT 14 7109 THM MS MOUNT 14 7109 THM MO A - Y Thruster		VDC VDC	5, 05 4, 97	5, 04 4, 96	5,03 4,96	1,95	5,03	5, 03 4, 95	5.04 4.95
7085		VDC	4.98	4, 96	4,99	4,98	4,95 4,98	4,95	1,95
7090 THM PSM Mount 7091 THM Ind Attitude 7092 THM RBV Radiator 7093 THM RBV Radiator 7093 THM WBVTR Root 7095 THM WBVTR Rod Ct 7096 THM WBVTR Strap 7097 THM WB MB Bay 1 7098 THM WB MB Bay 1 7098 THM WB WB TR Sep 3 7100 THM WBVTR Sep 3 7101 THM WBVTR 1 Cent 7102 THM WBVTR 1 Cent 7104 THM WBVTR 2 Bay 7105 THM WBVTR 2 By 16 7106 THM WBVTR 2 Ey 16 7107 THM NBTR B Sep 6 7107 THM NBTR B Sep 6 7108 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		VDC	5.15	5, 15	5, 15	5, 15	5, 15	5, 15	5, 15
7001 THM Ind Attitude 7002 THM RBV Radiator 7003 THM RBV C Ctr Bm 7004 THM WBVTR Root 7005 THM WBVTR Rad Ct 7006 THM WBVTR Strap 7007 THM WB Mt Bay 1 7009 THM WB Mt Bay 1 7009 THM WB MT Sep 3 7100 THM WBVTR Sep 17 7101 THM WBVTR 2 Bay 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 16 7104 THM WBVTR 2 Ctr 7105 THM WBVTR 2 Sep 17 7106 THM NBVTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR B ThM Ctr 7108 THM NBTR B MT 7109 THM MS Mount 14 7109 THM OA - Y Thruster	THM PSM Mount	DGC	21.02	21, 05	21,71	20,18	19, 36	19, 57	19,63
7092 THM RBV Radiator 7093 THM RBVC Ctr Bm 7094 THM WBVTR Root 7095 THM WBVTR Rod Ct 7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7098 THM WB NTR Sep 3 7100 THM WBVTR Sep 3 7101 THM WBVTR Sep 3 7101 THM WBVTR 1 Cent 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 7104 THM WBVTR 2 Ctr 7105 THM WBVTR 8 Sep 6 7106 THM NBTR B Sep 6 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DGC	17, 79	17.86	17, 24	17,17	16.88	16.75	16.55
7093 THM RBVC Ctr Bm 7094 THM WBVTR Root 7095 THM WBVTR Rod Ct 7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7099 THM WB Mt Bay 1 7099 THM WB MT Sep 3 7100 THM WBVTR Sep 3 7100 THM WBVTR 1 Cent 7101 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 16 7104 THM WBVTR 2 Ctr 7105 THM WBVTR 2 Sep 1 7106 THM NBVTR 2 Sep 1 7107 THM NBVTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR Bm Ctr 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DCC	18, 01	18, 06	16,24	15, 12	14, 58	14, 45	14, 16
7094 THM WBVTR Root 7095 THM WBVTR Rad Ct 7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7098 THM WB Mt Bay 1 7099 THM WB WTR Sep 3 7100 THM WBVTR Sep 17 7101 THM WBVTR 1 Cent 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 Bay 7104 THM WBVTR 2 Ctr 7105 THM NBVTR B Sep 6 7106 THM NBVTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR B Th 7107 THM NBTR B Th 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DGC	20.74	20, 82	19.31	18.42	18, 10	17, 92	17,95
7095 THM WBVTR Rad Ct 7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7098 THM WB Mt Bay 1 7099 THM WBVTR Sep 3 7100 THM WBVTR Sep 3 7101 THM WBVTR 1 Cent 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 7104 THM WBVTR 2 Ctr 7105 THM WBVTR 8 Sep 6 7106 THM NBTR B Sep 6 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7107 THM NBTR B Sep 1 7108 THM MSS Mount 14 7109 THM QA - Y Thruster		DGC	13.77	14.71	15.72	14.64	12.03	11.91	11.86
7096 THM WBVTR Strap 7097 THM WB Mt Bay 1 7098 THM WB Mt Bay 1 7099 THM WBVTR Sep 3 7100 THM WBVTR Sep 17 7101 THM WBVTR 1 Cent 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 16 7104 THM WBVTR 2 Ctr 7105 THM WBVTR 2 Ctr 7106 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR B Ctr 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DGC	3,64	4, 99	5, 55	5,21	3, 32	3.33	3,24
7097 THM WB Mt Bay 1 7098 THM WB Mat Bay 1 7099 THM WBVTR Sep 3 7100 THM WBVTR Sep 17 7101 THM WBVTR 1 Cent 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 16 7104 THM WBVTR 2 Ctr 7105 THM NBVTR 2 Sep 1 7106 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR Bm Ctr 7108 THM MS Mount 14 7109 THM OA - Y Thruster		DGC	15 90	16, 95	17,63	16.76	13, 61	13, 59	13, 48
7099 THM WB Mat Bay 1 7099 THM WB\TR Sep 3 7100 THM WB\TR Sep 17 7101 THM WB\TR 1 Cent 7102 THM WB\TR 2 Bay 7103 THM WB\TR 2 By 16 7104 THM WB\TR 2 Etr 7105 THM WB\TR 8 Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR B Ctr 7108 THM NBTR Bm Ctr 7109 THM OA - Y Thruster 7109 THM OA - Y Thruster	THM WB Mt Bay 1	DGC	22,91	22,60	22,49	20.95	21, 21	21,03	21, 29
7100 THM WBVTR Sep 17 7101 THM WBVTR 1 Cent 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 7104 THM WBVTR 2 Ctr 7105 THM NBVR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR Bm Ctr 7108 THM NS Mount 14 7109 THM OA - Y Thruster		DGC	22, 07	19.25	20, 14	18,15	18.53	17.94	18,71
7101 THM WBVTR 1 Cent 7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 16 7104 THM WBVTR 2 Ctr 7105 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR Bm Ctr 7108 THM MS Mount 14 7109 THM QA - Y Thruster		DGC	18,03	18.76	18, 12	18, 12	17.13	17.38	16.69
7102 THM WBVTR 2 Bay 7103 THM WBVTR 2 By 16 7104 THM WBVTR 2 Ctr 7105 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR Bm Ctr 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DGC	21,83	21, 55	23, 51	21.76	19,97	19, 86	19.96
7103 THM WBVTR 2 By 16 7104 THM WBVTR 2 Ctr 7105 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR Bm Ctr 7108 THM MSS Mount 14 7109 THM QA ~ Y Thruster		DGC	22, 45	23, 13	23.78	22,79	18, 70	18,73	18, 59
7104 THM WBVTR 2 Ctr 7105 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR Bm Ctr 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DGC	17.34	17.69	17, 29	17.17	16, 55	16,62	16, 15
7105 THM NBTR B Sep 6 7106 THM NBTR B Sep 1 7107 THM NBTR Bm Ctr 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DGC	21.77	20, 99	23, 87	21,21	19.50	19, 15	19.11
7106 THM NBTR B Sep 1 7107 THM NBTR Bm Ctr 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DGC	20.74	21.08	22, 34	20.64	17.92	17.64	17.73
7107 THM NBTR Bm Ctr 7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DGC	17,82	17, 96	17,86	17.35	16,89	16, 49	16,61
7108 THM MSS Mount 14 7109 THM OA - Y Thruster		DGC	22, 11	20.70	23, 85	20,75	19,96	19,67	19.82
7109 THM OA - Y Thruster		DCC	20.32	20, 44	21, 21	19,58 19.87	18, 63	18, 35	18,38
		DGC	20, 59	19.40	22, 86	22.86	18, 51 21, 76	18, 30	18,20 21,85
TARO TERM MISS WINTER BM		DGC	25,64	21.99	27,51	17.31	15, 26	21,49 15,07	14,97
7111 THM OA -X Thruster		DGC DGC	16,75	17, 54	18,21 20,43	19.16	19, 19	15.07	14,97
7130 THM Aux Pl T		DGC	20, 33	19,72	29, 67	6,53	5, 52	4.17	8,42
7131 THM Aux P2 T	LIBERUA PL I	DGC	34.18 2.90	6, 21 2, 22	6.97	19.96	11,29	0, 42	22,95

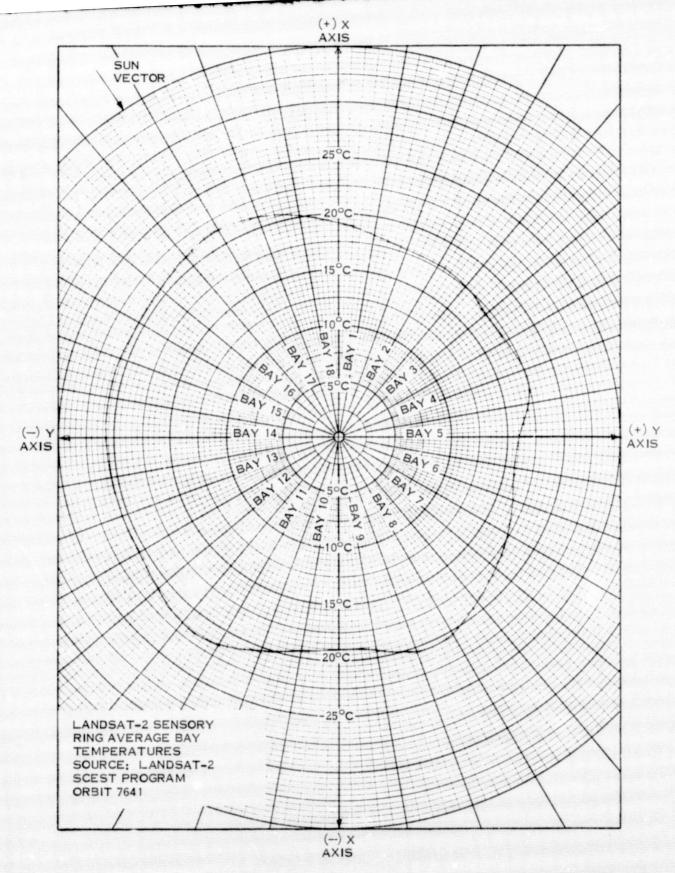


Figure 11-1. Landsat-2 Sensory Ring Thermal Profile

Table 11-2. Landsat-2 Compensation Load History

		Comp	ensati	ion Lo	ad Sta	tus*		
Orbits	1	2	3	4	5	6	7	8
Launch	0	0	0	0	0	0	0	0
2	X	X	х	х	х	0	x	Х
237	X	X	Х	X	Х	0	0	0
272	X	X	х	Х	Х	0	Х	Х
306	X	X	0	X	X	0 -	0	0
572	X	Х	. 0	Х	Х	0	0	X
1367	X	X	X	X	х	0	0	X
1645	Х	Х	0	Х	Х	0	0	Х
1657	X	х	х	x	X	0	0	Х
4202	0	0	х	X	0	. 0	0	0
4372	0	0	Х	X	0	0	0	X
6735	0	X	X	0	0	Х	0	0

Note

X = ON0 = OFF

# NARROWBAND TAPE RECORDERS (NBR)

The Narrowband Recorder Subsystem operated satisfactorily throughout the entire period, both Recorders alternating in Record and Playback modes with a nominal one minute overlap.

Since launch, each Recorder has operated for a period of 6898 hours.

Table 12-1 identifies cumulative operating hours for both Recorders by mode, and Table 12-2 gives typical telemetry values.

Table 12-1. NBR Operating Hours by Modes

NBR	On m	Off	Playback	Record
A	6898	6252	272	6626
В	6898	6252	272	6626

Table 12-2. Narrowband Tape Recorder Telemetry Values, Landsat-2

	Function		Typical	Telemetry	y Values -	Orbits			
No.	Name	6	3750- 3751	10862	15256	17684	19523	19931	20375
10001	A - Motor Cur. (ma)								
	Record	190.10	189.20	186.31	192.63	195.8	194.10	187.60	196.20
	P/B	180.00	178.69	180.00	N.A.	N.A.	186.30	181.57	192.60
10101	B - Motor Cur. (nia)						1		
10101	B - Motor Cur. (ma) Record	193.26	193.04	198.95	198,95	*	*	*	*
	P/B	188.18	185.44	187.89	202.1	*	*	*	*
10002	A - Pwr Sup. Cur. (ma)			1 1					
	Record	320.56	338.20	339.81	343.24	339.81	337.10	340.00	343.20
10102	P/B B - Pwr Sup. Cur. (ma)	535.78	568.38	567.75	N.A.	N.A.	559,40	562.80	572.90
	Record Record	317.62	336,05	350.00	346.75	*	*	*	*
	P/B	570.78	553,63	567.50	580.51	*	*	*	*
10003	A - Rec. Temp. (DGC)	25.47	34.40	23.60	22.00	21,20	21.00	23.00	20.80
10103	B - Rec. Temp. (DGC)	24.58	23.41	23.41	23.18	19,54	18.40	18.40	18.40
10004	A - Supply (VDC)	-24.47	-24.44	-24.62	-24,62	-24.62	-24,60	-24.60	-24.60
10104	B - Supply (VDC)	-24.44	-24.51	-24.29	-24.57	-24.71	-24.70	-24.70	-24.70

N.A. - Data not available

<sup>\* -</sup> No data. NBR-B out of service

# WIDEBAND TELEMETRY SUBSYSTEM (WBTS)

The WBTS has operated nominally in this report period.

Table 13-1 shows typical telemetry values. All are nominal.

Figure 13-1 is the AGC history recorded at Goldstone with the spacecraft successively at the same points in space. The scatter of data points reflect variations in the ground station calibration and readout. WBPA-2 has been used more consistently and is presented in this Figure. Values from WBPA-1 are nearly identical when this power amplifier is used.

Table 13-1. Wideband Telemetry Subsystem

				Or	bit		:	
(1) Name	T/V 20W	47	2462	5091	6362	6672	7431	7501
12001 Temp TWT Coll. (DGC) 12101 12002 Cur. Helix (MA) 12102 12003 Cur. Cath (MA) 12103 12004 Fwd Pwr (DBM) 12104 12005 Refl Pwr (DBM) 12105 12227 Con Volt Loop Stress (MHz) (2) 12228 12229 Temp Mod (DGC)	33.6 31.2 3.85 4.56 46.10 46.78 42.68 43.71 27.0 36.45 1.54	34.38 30.00 4.29 4.41 46.04 46.42 42.83 43.81 26.50 37.50 2.14 1.51 18.51	35.00 37.14 4.51 4.48 45.12 45.24 42.77 43.69 26.10 37.14 1.12 -0.01 20.88	F 32.16 F 4.59 F 46.00 F 43.61 F 37.08 F	F 31.87 F 4.68 F 45.74 F 43.70 F 37.39 F	31.88 28.75 4.05 4.79 43.00 45.85 42.41 43.73 25.62 37.16 1.71 0.45 16.25	32.50 24.38 4.13 4.65 45.12 45.54 42.74 43.70 26.30 35.38 1.68	35.63 26.69 4.06 4.63 45.05 44.66 42.78 43.56 25.85 36.50 1.60
12232 +15 VDC Pwr Suply (TMV) 12234 -15 VDC Pwr Suply (TMV)	2.65 4.07	2.65 4.27	2.65 3.94	2.65 4.04	2.65 4.10	2.65 4.04	2.55 4.00	2.60 4.04
12236 +5 VDC Pwr Suply (TMV) 12238 -5 VDC Pwr Suply (TMV) 12240 -24 VDC Unreg Pwr (TMV) 12242 Temp. Inv (DGC)	3.55 4.08 5.86 23.7	3.57 4.20 6.20 24.12	3.54 4.01 5.66 23.79	3.51 4.07 5.90 22.53	3.47 4.08 5.93 22.29	3.49 4.12 5.93 22.15	3.45 4.13 5.97 20.98	3.50 4.02 5.91 20.90

### NOTES:

<sup>(1)</sup> Function numbers for WPA-1 = 120XX; for WPA-2 = 121XX

<sup>(2)</sup> Any reading other than -14.0 or +14.0 is acceptable

F - Unit OFF in this period.

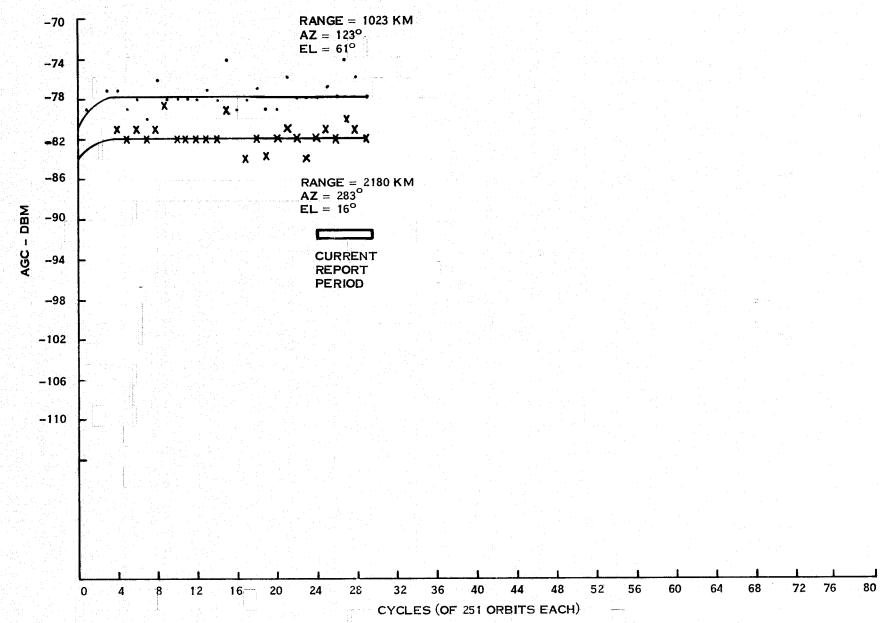


Figure 13-1. WPA-2 (Link 3) AGC Readings at Goldstone with 30' Antenna, Landsat-2

LS-2

# ATTITUDE MEASUREMENT SENSOR (AMS)

The AMS is a passive radiometric balance sensor which operates in the 14-16 micron IR band. AMS Telemetry Values are shown in Table 14-1.

The AMS was launched in the OFF mode, turned ON during Orbit 6, and has been performing normally since then.

Table 14-1. Landsat-2 AMS Temperature Telemetry

	ra l		Orbit Number							
Functio	n Description	Units	50	2532	5102	6362	6761	7210	7611	
3004	Case Temp 1	DGC	19.00	19.02	18.68	18.34	18.06	17.90	17.87	
3005	Assembly - Temp-2	DGC	18.70	18.71	18.30	17.88	17.66	17.45	17.45	

#### WIDEBAND VIDEO TAPE RECORDERS (WBVTR)

WBVTR-1 has had limited operational use through this reporting period because of previously reported problems with one of its Record/Playback heads (Orbit 2683, 3 August 1975). Ground stations were unable to obtain MSS video sync lockup because of failure of one of the 4 heads. As a result it cannot be used with MSS data but the NASA Data Processing Facility (NDPF) has developed a modification of their ground processing system so that it will perform satisfactorily with RBV data. RBV provides a synchronizing pulse which permits data from the bad head to be isolated and eliminated. This loss of 25% of the data is obscured by substituting an adjacent prior line of data maintaining usefullness of the scene for most purposes. A sequence of RBV scenes was recorded on WBVTR-1 during the fourth quarterly engineering test of the RBV (May 13, 1976). Sample scenes are shown in Section 16, Return Beam Vidicon. Since Orbit 7181 on 20 June 1976 the recorder has been used regularly in this service recording RBV data.

WBVTR-2 has functioned normally throughout this period.

Table 15-1 gives typical telemetry values for WBVTR-1 and WBVTR-2. Tables 15-2 and 15-3 show the telemetry values for Record, Playback, Rewind, and Standby operational modes.

Figure 15-1 shows tape usage for WBVTR-2.

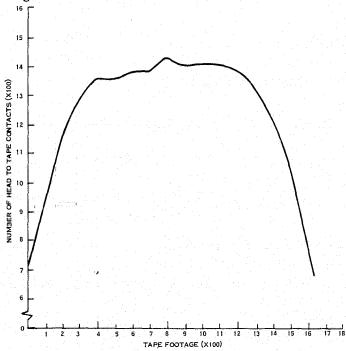


Figure 15-1. Tape Usage Thru Orbit 7630 WBVTR-2

WBVTR-	1 Functions		T	elemetry Valu	es In Orbits			
Number	-Name	45/46	2642	4879 (ET)	6322	6642 ET	7431	7628
13022	Pressure Trans	16, 52	16.5 <b>1</b>	16.39	16.25	16.38	16.12	16.14
13023	Temp Trans	20.74	20.62	20.12	18.70	19.00	16.96	18.70
13024	Temp Elec	25.00	24.57	21.68	19.58	19.61	20.01	19.05
13032	Limiter Volt	1.48	1, 51	1.41	*	1.48	1.53	1.48
13034	+5.6 VDC Conv	5.70	5.54	5.67	*	5.54	5.77	5.67
13201	+2 VDC APU	2.44	2.45	2.45	2.45	2.45	2.45	2.45
13202	Temp APU	29.06	26.76	27.29	26.44	27.68	27.50	26.44

WV√TR-	-2 Functions	Telemetry Values In Orbits									
Number	Name	45/46	2642	5071	6322	677 <u>0</u>	7230	7621			
<b>1</b> 3122	Pressure Trans	16.12	15.81	15.33	15.06	14.88	14.80	14.67			
<b>1</b> 3123	Temp Trans	21, 50	20.00	23.08	20.81	19.89	20.37	19.41			
13124	Temp Elec	23.50	18.31	22.72	19.89	22.29	23.92	22.07			
13132	Limiter Volt	1.30	1.32	1.28	1 <del>. 31</del>	1.34	1.33	1.35			
13134	+5.6 VDC Conv	5.71	5.69	5.85	5.71	5.54	5.59	5.87			
13201	-12 VDC APU	2.44	2.45	2.45	2.45	2.45	2.45	2.45			
<b>1</b> 3202	Temp APU	29.06	26.76	27.63	26.44	26.36	26.18	26.36			

(ET) - Engineering Test of WBVTR-1

\* - No data. WBVTR-1 out of service

Table 15-2. Function Values by Mode, Landsat-2 WBVTR-1 Telemetry

WBVTR-1			Orbit			· · · · · · · · · · · · · · · · · · ·		·
Function/Description	T/V	ORB 31/46	2642	4878(ET)	5688 (ET)	6644/6649	7208/7224	7628/764
3029 - Input P/B Voltage					i .	i		
Record	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Playback	0.33	0.60	0.32	0, 30	0.40	0.40	0.36	0.32
Rewind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standby	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3028 - Capstan Motor Current								
Record	0.32	0.31	0, 33	0.31	0.36	0.26	0.31	0.33
Playback	0. 29	0.26	0.31	0.30	0.33	0.34	0.30	0.35
Rewind	0.23	0,19	0, 23	0.28	0.31	0.29	0.23	0.31
Standby	0.0	0.0	0, 0	0.0	0.0	0.0	0.0	0.0
3030 - Headwheel Motor Current						1	1	
Record	0.50	0.50	0.50	0. 53	0.48	0.51	0.51	0.50
Playback	0.495	0.49	0.49	0. 53	0.52	0.52	0.52	0.53
Rewind	0.41	0.44	0.44	0.47	0.47	0.46	0.47	0.47
Standby	0.41	0.45	0.45	0.46	0, 47	0.46	0.44	0.44
3031 - Recorder Input Current						li .		
Record	3. 58	3,69	3, 69	3, 62	3, 58	3,65	3.67	3.62
Playback	3, 92	3.37	3.86	3, 86	3, 34	3.37	3,93	3.34
	2.18	2.23	2. 19	2, 23	2.30	2.26	2,30	2.28
Rewind Standby	1. 79	1.78	1.95	1, 95	1,95	1,92	1.81	1.81
3033 - Servo Voltage		<b>1</b> . **,						
Record	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Playback	49.99	50.01	50,08	50.37	50.18	50.37	50.18	50.04
Rewind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standby	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13026 - Capstan Motor Speed						1		
Record	89.77	88.61	88. 03	85.13	85, 13	85.13	85, 55	85.03
Playback	89. 37	88.35	86. 87	85, 13	86, 29	86.87	86.87	87.45
Rewind	100.12	100.2	98, 48	96.73	96.73	96.73	96.73	98.48
Standby	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13027 - Headwheel Motor Speed								
Record	97.5	96.72	95, 07	93, 96	93, 96	92.86	93.45	94.07
Playback	96.86	97.28	94, 52	92, 86	94.52	94.52	94.52	92.86
Rewind	98, 96	98.6	96, 73	96.73	94, 52	94.52	96,73	96.73
Standby	99. 12	98, 39	95,62	95, 07	93, 96	95,07	92.86	93.96

(ET) - Engineering Test of WBVTR-1

Table 15-3. Function Values by Mode, Landsat-2 WBVTR-2 Telemetry

WBVTR-2			Orbit					
Function/Description	T/V	31/46	2642	4878	5654	6644/6649	7207/7360	7626/
13129 - Input P/B Voltage							<del> </del>	
Record	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Playback	0.37	0.35	0.33	0.34	0.34	0.35		0.0
Rewind	0.0	0.0	0.0	0.0	0.0	0.0	0.32	0.3
Standby	0.0	0.0	0.0	0.0	0, 0	1	0.0	0.0
Scandby	0.0	0.0	0.0	0.0	"."	0.0	0.0	0.0
13128 - Capstan Motor Current								
Record	0.33	0.33	0.37	0.38	0.34	0.33	0.32	0.34
Playback	0.34	0.33	0, 34	0.35	0.35	0.35	0.33	0.34
Rewind	0, 16	0.20	0. 18	0.15	0.19	0.20	0.20	0,19
Standby	0.0	0.0	0,0	0.0	0.0	0.0	0.0	0.1
		1	""	0,0	]	1	0.0	0,0
13130 - Headwheel Motor Current		İ			!	1.		
Record	0.47	0.47	0.47	0.48	0.47	0.49	0.50	0.50
Playback	0.46	0.48	0.47	0.48	0.49	0.48	0.50	0.48
Rewind	0.43	0.44	0.42	0.41	0.44	0.42	0.47	0.49
Standby	0.45	0.43	0.43	0.41	0.41	0.41	0.49	0.42
13131 - Recorder Input Current				1				
Record	0.00	0.00	2.00	1				
	2,88	2.90	2.90	2.90	2.90	2.96	2.98	2.96
Playback	3.11	3.14	3, 08	3.11	3, 17	3.17	3.11	3.08
Rewind	1.79	1.80	1.80	1.80	1,84	1.80	1.84	1.83
Standby	1. 18	1,51	1.48	1.62	1.48	1.62	1.57	1.53
13133 - Servo Voltage						1		
Record	0.0	0.0	0.0	0.0				
Playback	48.92	49.00	49.52	1	0.0	0.0	0.0	0.0
Rewind		0.0		49, 43	49,23	49.43	49.23	49.52
Standby	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Standoy	0.0	0.0	0.0	0.0	0,0	0.0	0.0	0.0
13126 - Capstan Motor Speed								
Record	108,66	112.10	105, 33	105.33	105, 33	105,33	104.64	105.33
Playback	108.38	112.10	105, 33	103.96	104, 64	103.69	104.04	105.33
Rewind	130.09	120.43	116.31	117.68	118.37	116.31	117.68	
Standby	0.0	0,0	0.0	0.0	0.0	0.0	0.0	117.68
						1		. 0.0
13127 - Headwheel Motor Speed	00.41	00.00				1		
Record	98.41	98.08	96. 52	95.48	95.48	94.96	94.44	94,44
Playback	98.11	97.04	94.44	94, 44	94.96	94.44	94.96	94.44
Rewind	99, 95	98.6	95,48	96, 52	97.04	95.48	96.52	97.04
Standby	101.72	100.79	94.96	96.00	94.44	96.00	99.44	94.44

#### RETURN BEAM VIDICON

The fourth periodic test of the RBV Subsystem was performed on May 12, 13, and 14, 1976. In Orbit 6634, the downlink filters were configured and all RBV modes were set up. Engineering tests were executed in Orbit 6635. The RBV Subsystem and WBVTR-1 were exercised in real time and playback through Orbit 6667.

In Orbit 7181 and throughout this report period, the RBV and WBVTR-1 were used for limited operations. All RBV operations during this report period were nominal, and telemetry data was normal.

Table 16-1 gives typical telemetry values for the RBV Subsystem. Tables 16-2, 16-3 and 16-4 give telemetry values for Prepare, Hold, and Read modes of the three RBV cameras.

Figures 16-1, 16-3 and 16-5 are samples of Real Time RBV imagery taken by all three cameras during the test. Figures 16-2, 16-4 and 16-6 are images of the same scene played back from WBVTR-1.

NOTE: One head circuit of WBVTR-1 does not operate, as previously reported (Aug. 3, 1975). The NASA Data Processing Facility has implemented a hardware change which fills the missing line with repeat data of the prior line.

Table 16-1. RBV Telemetry Values

	Function			77.7	C	rbits		-1
No.	Name	T/V Value	54	2371	5662	6650	721t	7671
14001	CCC Board Temp. (DgC)	N/A	19,65	20.27	20,41	20,09	19, 52	19, 17
14002	CCC Pwr. Sup. Temp (DgC)	N/A	20,52	21,46	20.80	21,33	20,06	19.84
14003	15 VDC Sup. (TMV)	N/A	3,92	3,92	4.00	3, 92	3,37	.3,44
14004	+6V, -5.25 VDC Sup. (TMV)	N/A	2,92	3.07	3, 13	3,05	2,64	2,69
14100)		0.98	NA.	0.70	0.70	0.70	0.80	1,26
14200 } *	VID Output V (TMV)	0, 93	1,05	1,23	1, 26	1,22	0.70	1, 15
14300		1,06	1.03	1.27	1.31	1,18	0.69	1.05
14102		3,75-4.02	3,85	3.81	3,82	3, 82	3.82	3, 82
14202	Comb. Align Cur. (TMV)	3.87-4.10	3.91	3.92	3, 88	3,92	3,89	3,92
14302)		3,80-4.05	3.90	3,80	3.83	3,79	3,32	3.40
14103		N/A	24, 24	24, 40	26, 51	25, 03	22,67	22,41
14203 (*	Elec Temp, (DgC)	N/A	19.84	22,40	22.05	22, 37	20,38	20,01
14303		N/A	25,05	24.15	29,42	25,56	22.63	22,46
14104		N/A	23, 44	24, 13	26.28	24,69	22,01	21.83
14204	LV Pwr Sup T. (DgC)	N/A	18,14	20,87	20.61	20,86	18,59	18.32
14304 )		N/A	25,36	24, 12	29, 17	25, 36	22,45	22, 22
14105 )		3.92-1.07	4.00	3.94	3,96	3.93	3.44	3, 50
14205 }*	Defl. Pwr. Sup. +10 VDC (TMV)	3.95-4,10	3.97	3.92	3,94	3,95	3,98	3,98
14305 )		3,95-4.07	1,00	3, 95	3, 96	4,00	1,00	4.00
14106	†	3.65-3.80	3.67	3,59	3.63	3,63	3, 16	3,28
14206	L. V. P. S. +6V, -6.3 VDC (TMV)	3.67-3.80	3,65	3.61	3,62	3,60	3, 14	3, 19
14306		3.65-3.77	3.70	3,66	3.68	3,68	3,70	3.71
14107		2.53	2.61	2.51	2,61	2,63	2,54	2,53
14207 }*	Ther. Elec. Cur. (TMV)	2.43	2.49	2.44	2,51	2,50	3,31	2.31
14307		2.52	2,57	2,52	2.57	2, 32	2,94	2,85
14108		1.80-3.50	2,43	2,48	2,50	2.46	2, 19	2,23
14208 *	Vid. Fil. Cur. (TMV)	2.55-2.75	2.40	2,31	2,36	2,36	2.09	2,12
14308		2,50-2,80	2,58	2,54	2,54 2,96	2,53 2,99	2,25 2,99	2,27
14110 }		2, 95-3, 20	2,98	2,95				2,98
14210 }*	Vid. Tgt. Volt (TMV)	3.15-3.45	2.8G	2,93	2,96	2,90 2,59	2, 59 2, 26	2,64
14310		2.55-2.80		2,56	2,58			3.31
14113		2.86	2,92	2,79	2,81	2.86	3.51	3.22
14213 }*	Vert Def V (TMV)	3.09	3.15	2,99	3.05	3, 10	3,63	3,79
14313)		3.91	3,59	3.48	3, 44	3, 50	3, 54	3,09
14114	Language in the Control of the Contr	21.99	10.37	20,67	19,21	18,91 19,66	16.71 18.24	16, 32
14214	Vid FPT (DgC)	21.00	20,55	21.14	19,80			17.77
14314 )		22.66	20,65	21,12	20,56	20.18	18, 12	18.05
14115		24.17	21,04	22,41	21.31	20,57	18,22	17,79
14215	Foc Coil T (DgC)	23. 82	20,67	22,23	21,26	20.75	18,70	18, 16
14315 )	■ Date (1) Some Property of the property o	24,47	22,25	23.08	22,89	22,04	19,61	19, 17

<sup>\* 141</sup>XX refers to Camera 1 142XX refers to Camera 2 143XX refers to Camera 3 NA - Data not Available

Table 16-2. Camera #1 (Blue) Telemetry (Values in TMV)

				Orbit					
Function No.	Function Name	Mode	T/V Value	054	2371	5663	6639ET	7211	7671
14101	Focus I	Hold Prep Read	0.66 1,71 2.83	0.65 1.68 2.80	0.70 1.75 2,90	0.69 1.74 2.85	0.67 1.72 2.84	0.65 1.67 2.80	0.63 1.67 2.80
14109	Grid V	Prep Read Hold	$0.79 \\ 2.43 \\ 4.00$	0. 0 2.42 3.95	0.80 2.44 4.00	0.78 2.42 3.98	0.79 2.43 3.98	0.77 2.45 3.97	$0.77 \\ 2.45 \\ 3.95$
14111	Cath I	Hold Read Prep	0.38 0.84 3.03	0.38 0.83 3.05	0.40 0.85 3.10	0.37 0.83 3.02	0.37 0.84 3.02	0.37 0.85 3.02	0.37 * 3.02
14112	Hor Def	Hold Prep Read	0.01 1.79 3.23	0.00 1.75 3.25	0.00 1.80 3.30	0.00 1.77 3.25	0.00 1.78 3.21	0.00 1.80 *	0.00 1.80 *
14120	+500 ℧	Prep Read	0.92 4.05	0.85 4.05	0,90 4,10	0,90 4.05	$0.91 \\ 4.05$	0.90 4.05	0.91 4.03

<sup>\*</sup>No data due to slow TLM sample rate (1/16) which does not always get a sample for short "on time."

Table 16-3. Camera #2 (Yellow) Telemetry (Values in TMV)

				Search and the search	Orbit			a j	
Function No.	Function Name	Mode	T/V Value	054	2371	5663	6639ET	7211	7671
14201	Focus I	Hold Prep Read	0.58 1.60 2.71	0.54 1.56 2.65	0.60 1.60 2.70	0.53 1.54 2.65	0.54 1.56 2.67	0.52 1.52 2.65	0.50 1.50 2.62
14209	Griđ V	Prep Read Hold	0.83 2.25 4.13	0.75 2.25 4.05	0.85 2.30 4.10	0.80 2.22 4.11	0.80 2.21 4.11	0.80 2.25 4.07	0.77 2.25 4.07
14211	Cath I	Hold Read Prep	0.37 0.95 3.05	0.37 0.95 3.05	0.35 1.00 3.10	0.35 0.95 3.05	0.37 0.95 3.05	0.37 0.95 3.05	0.37 * 3.05
14212	Hor Def	Hold Prep Read	0.01 1.87 3.32	0.00 1.85 3.25	0.00 1.90 3.30	0.00 1.87 3.31	0,00 1,87 3,24	0.00 1.87 *	0.00 1.87 *
14220	+500 V	Prep Read	1.14 4.29	1.15 4.25	1,20 4,30	1.14 4.27	1.14 4.27	1.15 4.30	1.14 4.27

<sup>\*</sup> No data due to slow TLM sample rate (1/16) which does not always get a sample for short "on time".

Table 16-4. Camera #3 (Red) Telemetry (Values in TMV)

T) 1-2	Function Name	Orbit						
Function No.		Mode	054	2371	5663	6639ET	7211	7671
14301	Focus I	Hold Prep Read	0.65 1.79 2.85	0.70 1.83 2.90	0.72 1.85 2.93	0.69 1.82 2.90	0.65 1.77 2.85	0.65 1.77 2.85
14309	Grid V	Prep Read Hold	0.75 2.65 4.08	0.80 2.70 4.18	0.75 2.66 4.13	0.76 2.66 4.12	0.77 2.70 4.10	0.77 2.71 4.09
14311	Cath I	Hold Read Prep	0.39 0.54 3.25	0.40 0.55 3.30	0.40 0.55 3.22	0.40 0.55 3.23	0.40 * 3.25	0.40 * 3.23
14312	Hor Def	Hold Prep Read	0.00 2.05 3.35	0.00 2.10 3.45	0.00 2.07 3.42	0.00 2.06 3.41	0.00 2.07	0.00 2.06 *
14320	+500 V	Prep Read	1.15 4.25	1.20 4.30	1,15 4,27	1.15 4.27	1.15 4.27	1.15 4.27

<sup>\*</sup> No Data due to slow TLM sample rate (1/16) which does not always get a sample for short "on time".

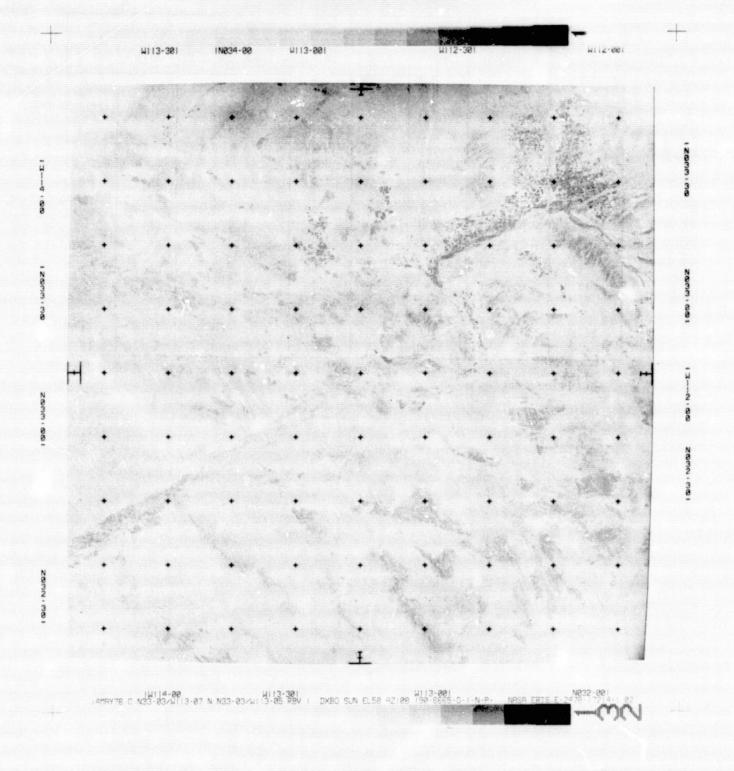


Figure 16-1. Landsat-2 Real Time Imagery - Camera 1

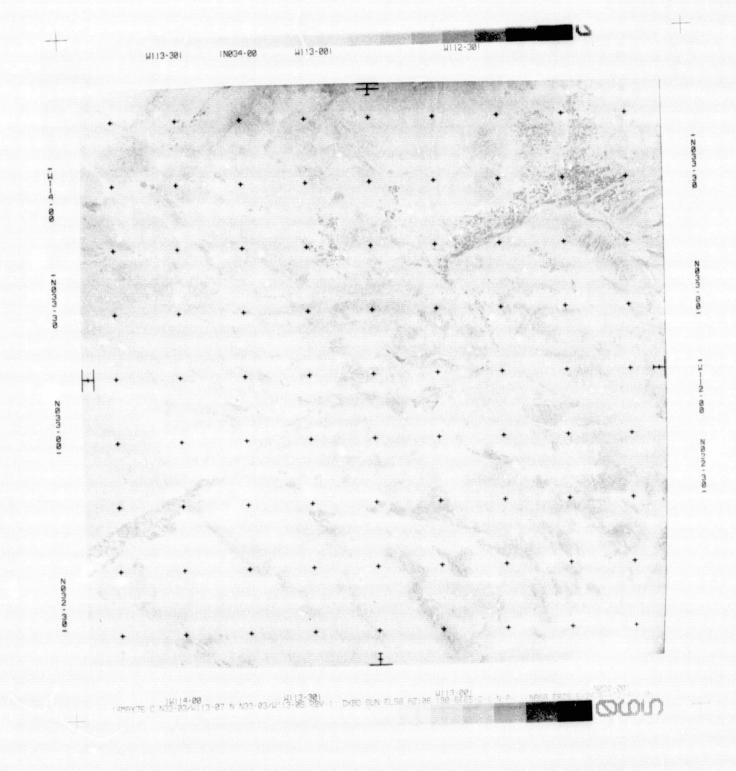
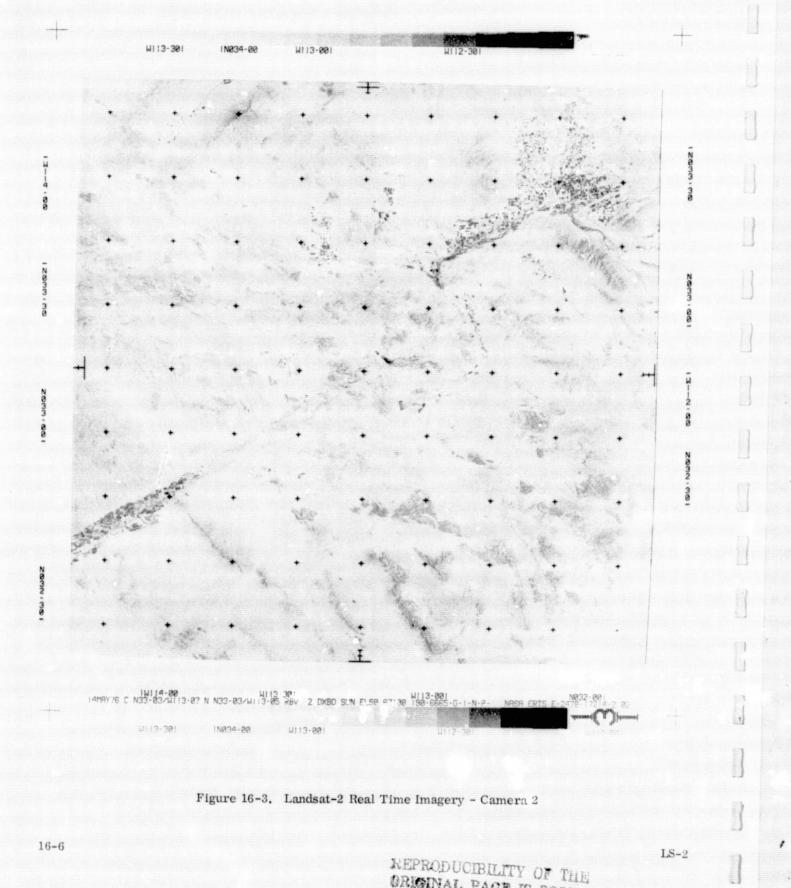


Figure 16-2. Landsat-2 Playback (WBVTR-1) Imagery - Camera 1



ORIGINAL PAGE IS POOR

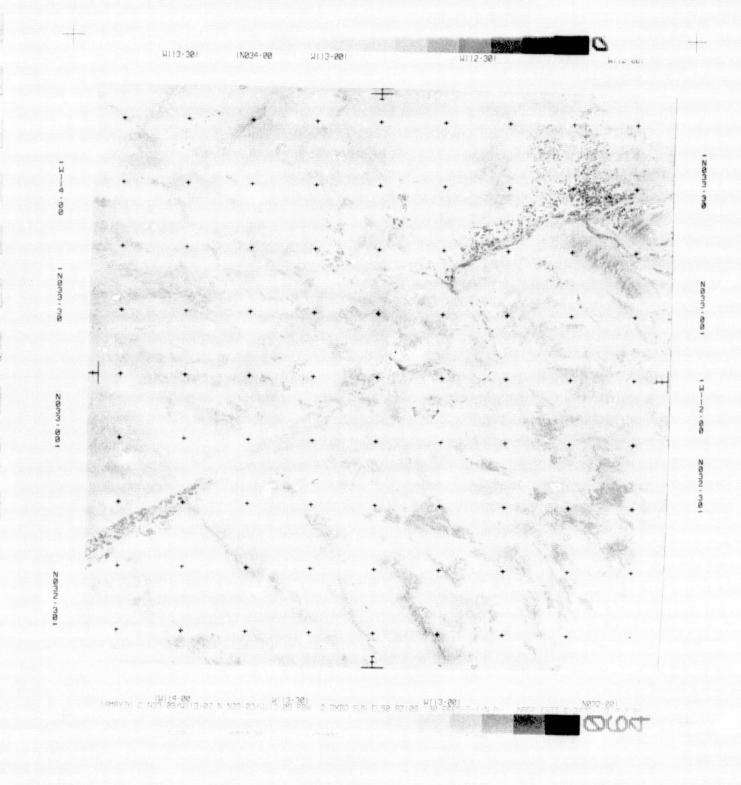
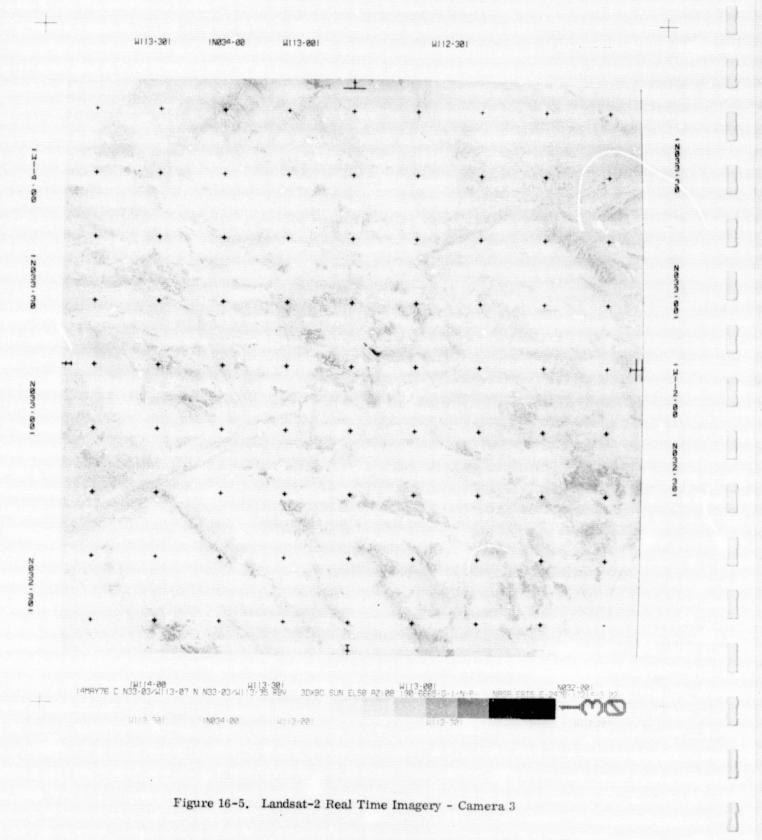


Figure 16-4. Landsat-2 Playback (WBVTR-1) Imagery - Camera 2



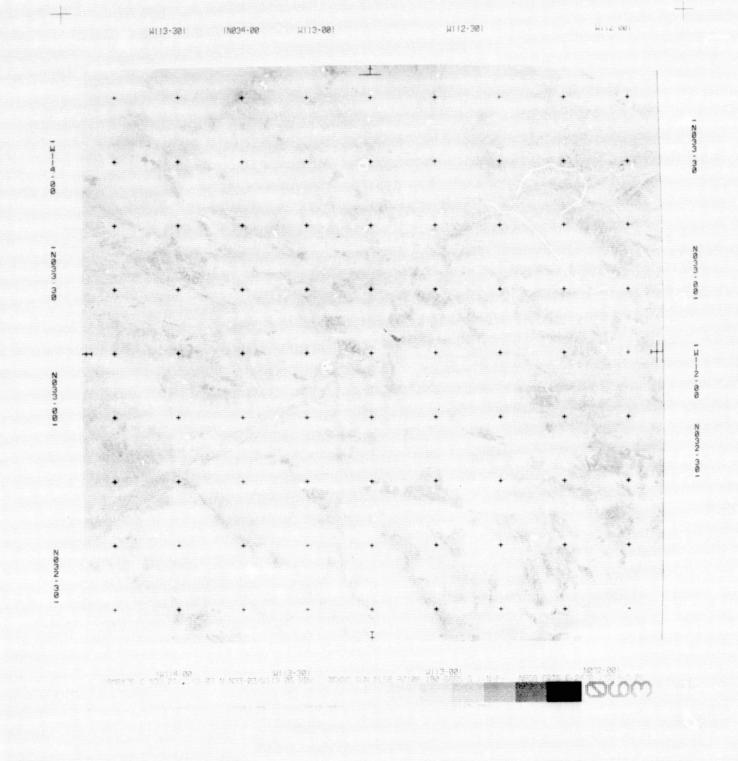


Figure 16-6. Landsat-2 Playback (WBVTR-1) Imagery - Camera 3

### SECTION 17

## MULTISPECTRAL SCANNER SUBSYSTEM (MSS)

The MSS Subsystem has operated nominally in this period without incident. Figure 17-1 shows the number of scenes imaged at each geographic location this quarter, and Figure 17-2 shows images since launch.

In these maps, only those scenes received by U.S. ground stations are shown. Scenes transmitted to Canada, Brazil and Italy (36% of total) are not shown.

Table 17-1 shows typical telemetry values since launch. All are nominal. Table 17-2 shows the history of sensor response to a constant input radiance level. Each sensor is sampled at 5 radiance levels and all show essentially the same trends. Only one of these levels (the second highest) is listed in Table 17-2. Line length history is also shown in Table 17-2 and is nominal.

Sun calibrations, performed every two weeks, show nominal performance.

	244555668331 25465846831 26465846831 2646884831 264688888888888888888888888888888888888	55 / 55 / 55 / 55 / 55 / 55 / 55 / 55	
	11 10 11 10 11 11 11 11 11 11 11 11 11 1	7945 2945	
	53 111 11111 111111 111111 67 222 81 322 95 31	1128	
	103 33 123 3 137 2 151 3	13430 0 P D	
	179 91 193 21 193 31 11111111	0 2 0 0 2 0	
	240 1111311111111111111111111111111111111		
	12 26 1172-335-344-444 40 1111-1111-345-35555555	014 0 020 0	
	DA DODAL POLATOR TOTAL A  AN DODAL POLATOR TOTAL BOTA  AN OUT OF THE STATE TOTAL BOTAL  AN OUT OF THE STATE TOTAL BOTAL	0.120 0.53 0 0.53 0	
	110 338333355665755777777	0.20 O.20 O.20 O.20 O.20 O.20 O.20 O.20	
	159 144444415000000000000000000000000000000	023 o 024 o	
	180 36669449449495777857817877878787878787878787878787878	20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	222 1 .46606v53v3b544v5. 236 .256526v65v5v55v25v 256 .2666465vv8b54c5b	018 0 017 0 017 0 017 0 017 0 0 017 0 0 0 0	
	13 125555666555555555555555555555555555555	018 0 017 0	
	69 266651111111114 83 12564	0.7 0	
	97 14 1911 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 44451 114111111	
	139	111111 52 4322 1742 0 6 0 0 5 0	
DI 21	209		
n a		15 91 0 8 9 0 8 9	
	55 55 111 111	1	
أ مدموم		0709	
ر در هد مد ک	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	22 1332 010 9 0 9 0	
hı nı w		012 6060566 72 3050555	
i ns		1015. 1015. 1016. 1016. 1016.	
		012 016	
	13 13 13 13 13 15 15 15 15 15 15 15 15 15 15 15 15 15	1111111111 33 025	
• [• •• pa		021 081 081	
		016	
		028	
	+ + + + + + + + + + + + + + + + + + +		

15 # 6	27.50	128. 128. 128.	193	165	123 151	109 401	95 81	67	Э. Э.	25 25	ก≱ #	\$64 141	104 404	192	10× 178	150 4	i Wa	ลู่	2 Y	r or	Ď,	ຫ ເ	u Tu	1	233 247	70.0	505 141	177	163	1 5 1 5 1 5	กัง	199	7.9	0 U	37	ם ע מ	7) Y 4 W 5 N	יער ו ביינו	190	75		ພູນ ຍຸນ	106 106	72	50	, (O) 1	10 a	217 231	1 89 203	161 175	147	655	91	17 07 10 4 0
1111 222 222 232 232 232 233 233 233 233		#1 11	ም አገድ	រូកប់ខ្	 ፙ ል ሞ	-: -: (8) [	1.2 24E	111		1111	25.5	4333d	33325 43395	FEECE	33233 33533	, E664	5656	26ECC	335c	مد مدر د د		1	3	14. 14.			1111	:		n. N. N.		232	}		ωį	<u>т</u> –	11111		<u>س</u> ا س ج	122	4 5 5 7)	3332	13231	26122 26443	14423	15262	3333	34433	122221	11241	#E4E4	3555 0.00 0.00 0.00 0.00 0.00 0.00 0.00	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
14112		111111						11	:										ıψ ¢	j 								•				111			11		•	111	111	יהים עוני עוני	יטו טו	י עיי	نب			•			ν <del>-</del> :	LS <sup>2</sup>	ขับ	ั้นั้ง	มัข้⊶	ມັນຸກ
4 + 47 5 4 5 5 5 7 8 6			1111					11111	۰ ۱۵ ۱۵										###### F######	1 ころんしん													72.							<b>⊷</b> ∩ı	l Rii∔	23111	=	3325									ν	11 12 12 12 12 12 12 12 12 12 12 12 12 1
\$1043434 \$1043434 \$6666\$655	11026	1111	11111					11 11	: -		116334	DO 14	11355	•	<del>-</del> 3	ง			7	いいいいいいいいいいいいいいいいいいいいいいいいいいいいいいいいいいいいいいい	خنغ										:		211111	_		:	11111		12		11111		Jī -	مر لد									. 41	₩ .
	pro-reportation amounts			#11 #	-			1111		16361	*************************************	\$5056 \$5056	133+55,	5506 5506	160006	94,44	999999	900000	ეჭისწტ ნგინწტ	1.555000	450066	40000	5545	125666	134356F	60000	444722	・ より より たの で で で	4040	* C. P. C. C. C. C. C. C. C. C. C. C. C. C. C.	5000	41.47	111,000	900+CV	1000	304 G9411	112556	1 400	345550	16304	110401	56511111 56511111	111111	•	11111									
	Same Space of the Company of the Com									۳	33 4	33322	25t tc	44444	ចំកំបូត / - ទំនុំបំពុំបំពុំបំពុំ	565655	90999	999999	300000	150656	744505	3000000	666666	666666	9999999 9999999	909999	3E1E1	656666	90,999,97 10,000,000	900000	399996	999999	555556	3080956	309999	85055u	309999	666655	565655	)                                     	055211	111111	111111		11111									
1 :				; ;;									<u>خو</u>	v .	7 7 7	564211	754449	U 4477	24444 24444	566555	557755	)	544455	156454E	5444654 444654	56666	10111100 10111100	655666	9655655 9655665	999299	555666	666665	64566	5644566 564666	banabe	5665556	3577756	557555	45555	111111	111111	111111	111111	:						\$48. <sup>7</sup>				
	Water Control																			1111	1111	311111	22111	11222	432277	1662227	35255	566611	)	100 m	ر ۽	1 J.	, <sup>1</sup> .	35511	J-011	2000	15000	2000	122222	11111	1111	-	_											
: · · ·												· · · 12.										- <sub>1-1</sub>	11		36725	186736	1111		<u>.</u>	16	F.	វ					111	11.	F	<b>-</b>	11			<b>,</b>										
	Transcript of Littleway Company					1			:	i di N													ļ.	1:															-			-				11								
													1.																		a consider the management				11	ນຸ																		
! · :   ·	To be a second									 																															;	ັບ	7 N N N 1 1	1111	й 	<b>∓</b> ,			ا د. پر <u>-</u>		-			•
						-			1														Î																				້ິລັ	ັມ			<b>-</b>							
					5	A T.4.	 Hs	ieu f			- 7,															1 . 1.												• ,										-				1 1112	1122222	
	# # # # # # # # # # # # # # # # # # #				ŢΗ	1F F	nLL	ן אינים. באינים	ING	MA	AP a	-anu	10 % S 1 4 5 (9 C	5 111 4 A	iseen Vija	114 E CH:	MIN'T	ነ ተ	TAK A L	CLS	 	iFR 1	E S	16: 1	At T 1	NFL I B	, F I N	67 2T	EΑ	CH		₹44	1E.															2001		144E21E	721111 1111	קר קר קר	ט ט	υ
								18	u TAL	 L:	1	182 160	2226 0.01	26 )(1%)	· · · ·	,942 16•t	127	7	;		25		13	43	0 7	1	34.	30 37 %	( )			## 13 h					1 -								\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	. 1.	<u>,</u>	Name of the last o	N	± ₩.	۲. درد	ສູນ		<b>≟</b> v
				! • •	1943			ር ‰ 1128	*	10,	) <sub>5</sub> .	2 - • • •	20% 20% 213	۶ 	30			40 92			50 83		6 	v 97		70 92	) ½	8	10% 24		900 90	an!	==	00% 629																				
	The second secon								ubrapada eta aran .	ļ																					-											j												
									-																										-					•														
<b>!</b>										1																				4.							19. 19.3																	
																	:=::::::::::::::::::::::::::::::::::::							<u> </u>		i T	1				-											1												
020 0 #10 0 930	014 0	0170	900	300	0 0 0 0 ₩ N	300 001	00°	0.00	, OK	00 00	0.810	021	022 0	017 0	100	0.0	220	220	0.000	036 0	000	9 6	026	000	0 2 2 0	0.00	250	920	200	026 0	017 0	000	031	180	025	200	0220	0380	035	0.00	037 0	033	031	CO C	0.00	20	0 0 0 0	0 5 0	100	10 C	014	014	017	0124 0124 0124
2000	ပပပ	OO	200	، و د	200	) D C	00	00	OK	201	O C	၁ဝ	ok	O C	) O	00	00	o o	<b>)</b> O	O	OC	0	D C	o 6	0	00	دا د	Oί	<b>.</b> O	0	οþ	0	O (	0	ပ	00	00	O C	ပုံ (	<b>)</b> 0	0 0	ם נ	000	oo k	000	<b>5</b> 6	00	O C	00	000	اداد	ပပ	ပပ္	200

FOLDOUT FRAME)

1 60 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	12585 12585 12581	24126 84 25443 49 15552 09	8 3443c 82 23231 36 14433	505 517 34331 531 23331 54433	161 1929 175251 691 175251 191 175251 189 175251 189 175251	1105 1105 1105 1105 1105 1105 1105 1105	21 144#7/ 35 123#44 63 355#52 77 123#44 77 122#47	230 143+43 244 133522 7 133827	174 2354 174 2354 184 3334 190 354 190	12 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	76 1 27 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	: a n	25.00 25.00 20.00	1 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1103 1127	ያው ሚካር መቀመት መቀ	សល់ល់ #ស្មេស បាល់ឈ្មាត់!	158 172 186 200	1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	000 000 000 000	Y F W → F →	7 4 4 4 7 4 4 7 6 6
22221 1111 22221 1111 22221 1111 22221 11111	23111 1565 241 1 141	13322				٠ •	5111 1116 126 126 126 126 126 126 126 126				• • •	10 mm	oph combined to the party of th	ton you you	1311111574556 111111155554 11111155554	1 111111111111111111111111111111111111	1111 156666050 1111 159465960 13445545404 544456545404	15/5554350	4 C C C C C C C C C C C C C C C C C C C	140000000000000000000000000000000000000	2000 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1014648 1014648 1014648
11111111111111111111111111111111111111			111/11/11										52 52	1271		10000000000000000000000000000000000000	05045 0564533 4555532 9554532	200000 200000 200000 200000	5 G99600 442600 442600	144547950022224544465 134344500000000 1 44544400000000000000000000000000000000	2000 + 1000 + 1000	5.54 6.54 3.3 45.4 3.3 5.4 5.0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4
	•	# · · · · · · · · · · · · · · · · · · ·								ink ink ink ink jus jus jus jus				W 70 = = = = = = = = = = = = = = = = = =			ม ผู้	טנ				1 % W W
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	1 1 1 1 N N	ט ט.																				
				1	111 271 3444333 31234443 12337 12337	11122	112222															
		and the second s			N & W N																	
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2001	ဥ္ပင္သေ (	ခင္ဆဝင	0000	22221	00000	<u> </u>	0000	0000	0000	0000	00001	0000	) ဝင္ပင္ပ	2000	00000	3828F	22221	0000	00000	2000	0.00

```
The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              0 0
0 0 0
0 0 0
0 0 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1111
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             221
```

Figure 17-1. MSS Scenes Imaged this Quarter

FOLDOUT FRANCE

Ź.

17-3/4

	************	######################################	6 8 3 3 5 4 5 4 5 7 5 6 8 E Y E 7	******************	STATE OF THE CONTRACT OF THE C	\$325 EV
			4.23.44.23.44.45.45	N= 0434440000 x	The second secon	
				**************************************	ער את תייביר את מינון יותר לייני בער איני לייני לייני לייני לייני לייני לייני לייני לייני לייני לייני לייני לי מיני בער מיני לייני בייני לייני לייני לייני לייני לייני לייני לייני לייני לייני לייני לייני לייני לייני לייני	
	\$4 \$40 per per per per \$1 \$1 \$1 \$10 per	+ 475 446 QB 479 - 46 4 75 > 0 45 8 Q+V+	6	· PRESENDENTS	ma	
					Yes 14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	H E V V
	44 M - 10 m - 10		Table pa			4 7 0
	PERMIT PER NO	HE TO THE THE THE PARTY OF THE THE THE THE THE THE THE THE THE THE	A + A			(0 ←)
<b>:</b>	**********	THE STREET OF THE PROPERTY OF THE STREET	nana in manan	ur nu	ال الكافئة بية طوري المويدين . و الكافئة في الموسد الله الكافئة في الموسد .	
	4444144 2444144	31 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~ 0 ~	Name of the second	UP Sai	ው ው ቢ መለንም ግ ተነው ነው መስነ ህም	
		\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	Lengto → to αν Manua → to α	10 days.	a pa bade	
	4428.4	T T T F G T W W W W W W W W W W W W W W W W W W	מי איייניבעם			4 (14
	*****	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	15-11-11-11-11-11-11-11-11-11-11-11-11-1	- 44 m m	ad, extinate ;	1. 1
Mark Section (Control of Control	- , p p	4 4 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1	X 7 FW F*** H W + V W W + X T FW F*** H W W W W W W W W W W W W W W W W W	N + U + A A E +	no notes to	
water many	<b>u</b> u	973.477 = 43.484 (10.4	* w u - u - u - u - u - u - u - u - u -		Manager of the particular of t	712
A A Maria Ma	al.	the state of the s	emme verjeuppenvevever	*******	ன் நெயியுக்கு நிரும் கலையாரும் மல் முரியிருக்கு ஐந்ம் ஆய் மேரியிருக்கு முற்று வருக்கு முற்று வரும் வரும் வரும் நிருக்கு நெயியுக்கு நிருக்கு நிருக்கு நிருக்கு நிருக்கு நிருக்கு நிருக்கு நிருக்கு நிருக்கு நிருக்கு நிருக்கு	25.55
Tank of oxilian the Alaba tanants o		* * * * * * * * * * * * * * * * * * *	**************************************		ക്കാനുക്കാനുക്കാനുക്കുന്നു. ഉപപ്പുക്കുക്കുക്കുക്കുക ക്രോഗ്രീയ് അവിക്കുക്കുക്കുന്നു. ആരം അവിക്കാര്യം ആരുക്കുക്കുക്കുക്കുക്കുക്കുക്കുക്കുക്കുക്	
**************************************	•	-	بيدى سن≎ بىدىد ما 10 ⊶		### ##################################	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		-		ั้น ถ้นนี้นี้ ถึงขึ้น ถ้นนี้ ถึง ถึง ถึง นะ ราคราว ประการ ประการ เ	00 00 00 00 00 00 00 00 00 00 00 00 00	SCHOOL !
	*** V		; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	# W W W W W W W W W W W W W W W W W W W	# # # # # # # # # # # # # # # # # # #
The man to the second s		•		# 17 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1	יים ביים אינים אינים ביים אינ אינים אינים אינים אינים אינים אינים אינים אינים אינים אינים אינים אינים אינים אינים אינים אינים אינים אינים אינ	0 y
### ### ### #### #####################	to .			มาการและเลา เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์ เการ์	งทุกทุกคุณแบบแบบจากคุม ของคุย ชีวิธี ซึ่ง ซึ่งที่ ซึ่งที่ที่จัดที่ที่ พ.ศ. 6 ค.ค.ค.ค.ค.ค.ค.ค.ค.ค.ค.ค.ค.ค.ค.ค.ค.ค.	3 to 10 hairs
w definition of the transfer of the second o	70					* 0 Abb
	N			- 12 5 2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	\$\frac{1}{2}  \langle \text{ \	
TANK TO THE TANK TO SENT THE THE THE THE THE THE THE THE THE TH	V ***;				THE STATE OF THE S	*****
שיייני יייני איני איני איני איני איני אי	٠,				200 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	*****
The open mineral in the state of the open and and the open and and the open and and the open and and and and and and and and and an	1 1			. เกม	nime a chimina con a ser in a manage me a manage me a manage me a manage me a manage me a manage me a manage me	NN :
	1			w		ν- γ
and of the control of				4.1	aging example of the state of t	
מין בי און מין מין מין מין מין מין מין מין מין מי			·· ;	· · · · · · · · · · · · · · · · · · ·	கம் சர்வு வரி நாக்கு பிரும் முக்கி வரியிரும். கூடி சுர்வி வரியிரும் முக்கி வரியிரும். வரியிரும்.	ນ 🕶
			•		to be to the term of term of the term of term of the term of the term of term of term of term of term of term of t	
w rendambemma xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx					भ दास्य भागाणाः भागाः स्थापः	
n noonannan zizz					சூ சூ சு மி அம்மிய சிரும் அம்	பர்பாக வ முரு சோழ்க் ஆ
25 Antenne A A A A A A A A A A A A A A A A A A					ut No	10 F W 10 W 40
or unemen w						V
gh-On-Life and service and ser						
+ Nu+				4		
• • •					, , , , , , , , , , , , , , , , , , ,	
μα <u>(μ</u> μα μα μα μα (μα (μα (μα (μα (μα (μα (μα	100					<u>-</u> 1
# # # # ###		•			- 44-4	. a . iu
2: LSS - pri tri pri tri	1.0 pag 1.0 pag				; 	9 C 13
ימשימה עני ער מעני ע	Secret Reporter				· · · · · · · · · · · · · · · · · · ·	40 - 4 - 44 - 4
மும் முறை சம் மு					in the second of	1 4 A B B
					langung bermulan di kacamatan di kacamatan di kacamatan di kacamatan di kacamatan di kacamatan di kacamatan di Kacamatan di kacamatan di kacamatan di kacamatan di kacamatan di kacamatan di kacamatan di kacamatan di kacama	சு மன் சு
கிற சிற புடிய சிச்சி மி சிரையால் உள்ள	arar near and to the to the tree to	райн Дуун ун				
	ህ መስጠብ ነው። መጥሞው ከ ተመቀመው የተመመመመው የተመመመመው የተመመመመው የተመመመመው የተመመመመው የተመመመመው የተመመመመው የተመመመው የተመመመው የተመመመው የተመመመመው የተመመመመው የተመመመመ የተመመመመ መመመመመመ የተመመመመመ መመመመመመ መመመመመመመመ	parties (R. parties) (A. partie				சு மன்ன் வ
** # # # # # # # # # # # # # # # # # #	ያ የመሰው ነው። መጥያ የመ መጥያ የመ የተስቀ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ የ	The latest the latest				சு மன்ன் வ
e comente → > En Japa F U Reprete Geberatus	TO TO THE ACT OF THE A					சு மன்ன் வ
# FROM P. R. R. R. R. R. R. R. R. R. R. R. R. R.	TO TO THE ACT OF THE A	#####################################				சு மன்ன் வ
FINITE TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL	THE THE THE THE THE THE THE THE THE THE	### ## ## ## ## ## ## ## ## ## ## ## ##				சு மன்ன் வ
# FOURTHER TO **  > ** ** ** ** ** ** ** ** ** ** ** ** **	THE THE THE THE THE THE THE THE THE THE	### ## ## ## ## ## ## ## ## ## ## ## ##				சு மன்ன் வ
######################################	THE THE THE THE THE THE THE THE THE THE	### ## ## ## ## ## ## ## ## ## ## ## ##				சு மன்ன் வ
######################################	### ##################################	### ## ## ## ## ## ## ## ## ## ## ## ##				சு மன்ன் வ
######################################	### ##################################	### ## ## ## ## ## ## ## ## ## ## ## ##				சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### #### #########################				சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### ### ### ### ### ### ### ##	0	ATA USEU FKS-1 CYCUE ] YU a PE FELLUAINA mar shuns when A	Tracks have instance for each France.	சு மன்ன் வ
# FOURTHER TO **  > ** ** ** ** ** ** ** ** ** ** ** ** **	TO THE PROPERTY OF THE PROPERT	### ### #### #########################		PASSITE SEN	EJ AUGU PHOS ACCEPT	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	OT	PASSITE SEN	EJ AUGU PHOS ACCEPT	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	391	Possible 15 m A 1 Em Possible	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	391	Possible 15 m A 1 Em Possible	EJ AUGU PHOS ACCEPT	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	391	Possible 15 mm 4 1 5 mm 7 mm 7 mm 7 mm 7 mm 7 mm 7 mm 7	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	391	Pespitti adm 	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Possible 15 mm 4 1 5 mm 7 mm 7 mm 7 mm 7 mm 7 mm 7 mm 7	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Prisoner and the prison	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Prisoner and the prison	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Prisoner and the prison	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Prisoner and the prison	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Prisoner be be be be be be be be be be be be be	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Prisoner be be be be be be be be be be be be be	27	சு மன்ன் வ
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Prisoner be be be be be be be be be be be be be	27	சு மன் சு
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Prisoner and the prison	27	சு மன் சு
######################################	TO THE PROPERTY OF THE PROPERT	### ### ### #### #####################	sit	Prisoner and the prison	27	சு மன் சு

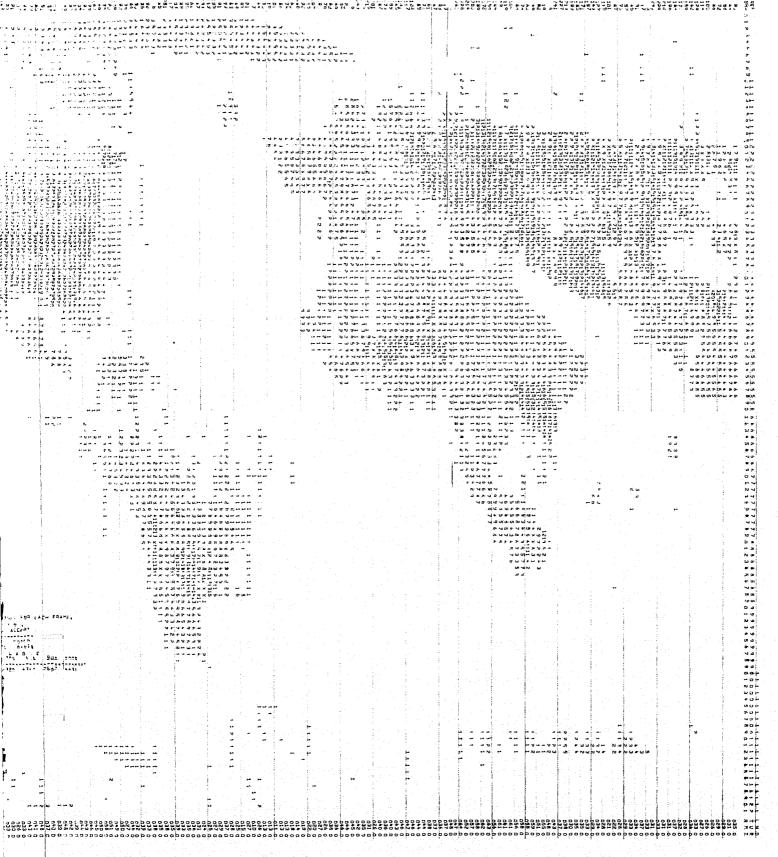


Figure 17-2. MSS Scenes Imaged Since Launch

LS-2 FOLDOUT FRAME 2

Table 17-1. MSS Telemetry - Landsat-2

ſ			*T.V.	··· • -,		<del></del>	Orbit			
	Function	Name	Norm	27	2500	5091	6362	6761	7210	7641
ſ	15040	MUX -6 VDC (TMV)	3.92	4.05	4.04	4.07	4.04	4.05	4.05	4.05
	15041	A/D SUPPLY (TMV)	5.74	5.95	5.95	5.95	5.95	5.95	5, 95	5,93
	42	AVERAGE DENSITY (TMV)	1.72	1.71	2.39	1.95	2.39	2,39	2.32	2.16
	43	FIBER OPTICS PLATE 1 TEMP (DGC)	22,30	18,13	20.41	21.75	20.59	17,57	17.47	17, 21
	44	FIBER OPTICS PLATE 2 TEMP (DGC)	22.30	17.87	18.86	20.28	19.04	15.70	15, 59	15, 29
. [	45	MUX TEMP (DGC)	25.59	23.38	20.57	23.63	21.48	20.56	20.87	19, 57
	46	ELEC COVER TEMP (DGC)	23.09	20.25	21.40	22.96	21.72	17.20	17, 21	16.63
- 1	47	PWR. SUP. TEMP. (DGC)	23.85	19.45	19.83	21.62	20.19	17,40	17.49	16,51
ı	48	SCAN MIR REG. TEMP (DG )	23.44	18,30	18.29	21.13	19.07	16.76	16.87	15.93
	49	SCAN MIR DRIVE ELEC. TEMP. (DGC)	24.34	18.96	18.49	21.42	19.32	17,06	17,22	16.01
	15050	SCAN MIR DRIVE COVER TEMP. (DGC)	22.50	17.26	18.28	21.21	19.21	16,80	16.84	16.02
ı	51	SCAN MIR TEMP (DGC)	21.87	17.26	18.09	20.89	18.76	16.52	16, 51	15.87
	52	ROT. SHUT HOUSING TEMP (DGC)	22,58	23.26	18,91	20.28	19.03	15,66	15.60	15.29
	53	SCAN MIR REG VOLT (TMV)	4.56	4.7	4.57	4.57	4.63	4.60	4.59	4.39
	54	CAL LAMP CURRENT (TMV)	1.18	1.17	1.20	1.17	1.17	1,17	1.17	1.17
	55	BAND 1 15 VDC (TMV)	4.97	4.98	4.97	4.97	4.97	4.97	4.97	4.97
	56	BAND 2 15 VDC (TMV)	5.00	5.00	5.00	5,00	5.00	5.00	5.00	5.00
	57	BAND 3 15 VDC (TMV)	4.88	4.95	4.95	4.95	4.95	4.95	4.95	4.95
- 1	58	BAND 4 15 VDC (TMV)	4.83	5.00	5.00	5,00	5.00	5.00	5.00	5.00
	59	TLM 15 VDC (TMV)	5.04	5.06	5.07	5.07	5.07	5,07	5,07	5.07
	15060	+12 VDC +6 VDC (TMV)	4.92	5.03	5,02	5,02	5.02	5,02	5,02	5.01
	61	LOGIC +5 VDC (TMV)	4.86	4.81	4.80	4.83	4.80	4.84	4.83	4.83
	62	RECT. +19 VDC (TMV)	4.97	5.03	5.05	5.05	5.05	5.05	5.05	5.05
-4	63	RECT19 VDC (TMV)	3.54	3.60	3.60	3.60	3.52	3.60	3.60	3.60
	64	BAND 1 HVA (TMV)	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95
	65	BAND 1 HVB (TMV)	5,03	F	F	F	F	F	F	F
	66	BAND 2 HVA (TMV)	4.72	4.70	4.72	4.75	4.72	4.72	4.72	4.71
	67	BAND 2 HVB (TMV)	4.70	F	F	F	F	F	$\mathbf{F}$	F
	68	BAND 3 HV A (TMV)	4.75	4.72	4.76	4.73	4.75	4.75	4.75	4.75
	69	BAND 3 HVB (TMV)	4.65	F	F	F	F	F	$\mathbf{F}$	F
1	15070	SHUT MOT, CONTR, INTEG (TMV)	2.49	2.60	2.60	2.60	2.60	2.57	2.58	2.60
	15071	SCAN MIRROR DRIVE CLOCK (TMV)	1,93	2.0	2.00	2.00	2.01	2.00	2.00	1.99

<sup>\*</sup> Thermal Vacuum Test Data at 20°C F = Unit OFF

Table 17-2. MSS Response History - Landsat-2

# Quantum Level for Selected Word (0 = Black; 63 = White)

Band	Sensor	Launch	Average Value Since Launch	This Quarter	% Change Since Launch
1	1 2 3 4 5	43 41 46 46 44 46	40 40 43 45 40 43	39 39 42 44 39 42	-9 -5 -9 -4 -11 -9
2	7 8 9 10 11 12	47 44 48 50 48 47	45 40 46 48 47 44	45 40 46 47 47 43	-4 -9 -4 -6 \(\frac{1}{2}\)
3	13 14 15 16 17 18	42 44 47 47 48 46	40 43 46 45 46 44	39 42 46 46 46 44	-7 -5 -2 -2 -4 -4
4	19 20 21 22 23 24	25 26 32 29 32 28	25 27 32 30 33 28	25 26 31 29 32 28	0 .0 -3 0 0
	Line Length	3250	3249	3247	-0,09

### SECTION 18

## DATA COLLECTION SYSTEM (DCS)

The DCS Subsystem performed nominally during this report period, continuing message collection at substantially the same rate.

Figure 18-1 shows the number of DCS messages received in each 18-day cycle at OCC, and the percentages of good messages for each cycle. The large number of messages shown for February was due to an accidental mode selection for one of the ground transmitters, DCP-6402.

There are 45 users in the data base. 246 DCP's have been shipped with 242 in the data base. The number of active DCP's per day averaged 103, a normal number.

Table 18-1 shows telemetry values since launch. All are nominal.

Table 18-1. DCS Telemetry Values

	en en en en en en en en en en en en en e			Or	bits			
Func. No.	Name	5	2462	5091	6362	6761	7210	7641
16001	Receiver 1 Sig Strength (DBM)*	-123,34	-124.81	-122,02	-125.00	-122.35	-122.84	-123.16
16002	Receiver 1 Temp (DGC)	22.54	24.20	24.37	23.51	25.18	25,07	25.12
16003	Rec-1 Pwr Input Volt (VDC)	2.35	2.36	2.36	2.35	2.37	2.37	2.37
16004	Receiver 2 Sig Volt (DBM)	F	F	F	F	F	F	F
16005	Receiver 2 Temp (DGC)	F	F	F	F	F	F	F
16006	Receiver 2 Input Volt (VDC)	F	F	F	F	F	F	F

<sup>\*</sup>This value is for a CW carrier only; it is not valid during DCS message reception

F = Receiver 2 was OFF

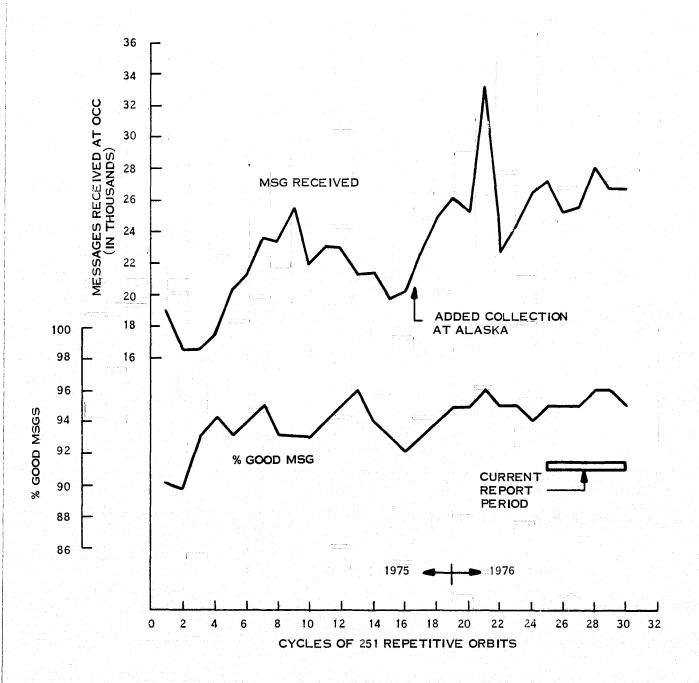


Figure 18-1. DCS Message History

Landsat-2 Anomalies and Observations

Date	Anomaly/Observation	How Observed	Comments
Preliunch	Forward Scanner	Spacecraft	Before launch pressure increased. After launch pressure
	Pressure Leak	Integration	decreased. No anticipated effect on Scanner or S/C mission.
Prelaunch	Defective TLM Functions	Spacecraft	Functions are temperatures which are noncritical. Sensors
	1264, 4002, 13200	Integration	failed prior to launch. Mission unaffected.
3/8/75	Unencoded command 781, CIU	On-Line	Non-Landsat OCC Authorized Unencoded commands received
	Channel B Off, received by		in Orbit 619, 640, 743, 1575, 1700, 2605, 3164, 5025.
	spacecraft from RF Interference. Commands 782 or 786.		
	switch comdecs; and commands		
	780 or 784, switch PWM regu-		
100	lator, received at other times.		
	moor, received in ourer times.		
3/17/75	MMCA Pitch Flux Density TLM	Off-Line	Telemetry decreased 5 counts and indicates increase flux
	Drift		density on charged magnet. Probable sensor drift. No
			apparent effect on S/C performance.
4/5/75	WBVTR-1 Rewind Failure	On-Line	WBVTR-1 failed to execute Rewind command or prematurely
1	(MDR E01252)		terminated rewinds due to false BOT signal. Subsequent
			commands or Fool-Logic techniques allowed return to oper-
		A Section 1	ation. Investigation Committee report issued. Problems
		2.5	occurred Orbit 1021, 1532, 1568, 2238. Operation restricted
1			to 300 thru 1500 feet.
6/9/75	WBVTR-2 had Short Rewind	On-Line	WBVTR-2 started rewind but stopped prematurely in Orbit 1919
0/9/10	(MDR E01255)	On-Line	and again in Orbit 3854. Investigation Committee did not define
	(MDR E01233)		a probable cause but assigned a momentary False BOT as reaso
1			for short rewind. Unit remains operational.
			for short reward. Out remains operationar.
8/3/75	WB√TR-1 data did not provide	On-Line	One head circuit of WBVTR-Lifailed to operate. 25% of data lost
3, 3,	sync to ground station		in data stream. Operation discontinued.
	(MDR D04930)		
11/14/75	MSS False End-of-Line Codes	Off-Line	Occasional End-of-Line codes occurring in preamble or along
	(MDR D04940)		video data. Creates 4 black and 4 white words in scene data.
		1.00	Occurs over magnetic anomalies with low incidence rate.
- / /		l	
1/25/76	Solar Array Current Notch	On-Line	In Orbit 5123, abnormal drops in solar array current appeared
	(MDR D04934)		for portion of satellite day. S/C operation unaffected because solar array has excess power to date.
4			Solar array has encess power to date.
7/20/76	Battery 6 Turned Off	Realtime &	Battery 6 decreased in load share and rose in charge share
1/20/10	Banciy o ruined On	Off-Line	thereby causing overcharge. Temperature increased and unit
		J	was turned off in orbit 7601.

## LANDSAT-2

SPACECRAFT ORBIT REFERENCE TABLES
FROM JANUARY 1976 THROUGH DECEMBER 1977
ORBITS 4787 THROUGH 14980
FLIGHT DAY 344 THROUGH 1074

LANDSAT-2

	1	GMT		SPACECRAFT   REFFR		117.00
	L DYLE.	7-"DAY	DAY	BRBITS THE	ITS   DAY	i Ne ₁
· · · · · · · · · · · · · · · · · · ·	1	11	344	4787- 4800 1 210-	223   16	18
	1 2	1 2	345	4801- 4814   224-	237   17	1 18
	3	3	1 346	" 4815- '4828   238-	251   18	1 18
	4	1 #	1 347	4829- 4842   1-	14   1	19
	5	1 5	348	*** 4843= 4856   *** 15=	28 7	19
	1. 6	1 6	1 349	4857- 4870   29-	42 3	1 19
	7	7	1 350	4871 # 4884   43=	56   4	1 19
	) 8	1 8	1 351	- 4886 <b>-</b> 4898   57-	70   5	19
	9	1 9	1 352	4899- 4912   71-	84   6	191
	1 10	1 10	1 353	4913- 4926   85-	98   7	1 19 1
	1 11	1 11	35#	4927-"4940   "" 99-	112 1 8	1911
	1 12	1 12	1 355	4941- 4954   119-	126   9	1 19 1
	1 13	1 13	1 356	4955- 4967   127-	139   10	1 19 1
	1 14	1 14,	357	496x= 4981   140=	153   11	191
	t = 15	1 15	1 358 (	4982- 4995   154-	167   12	1 19 1
	1 16	1 16	1 359	4996- 5009   168-	181   13	19
	17	T	360	T5010# 5023 T T182#	195 77 147	1 -19
	1 18	1 18	361	5024- 5037   196-	209   15	19
	1 19	r 19	1 362 1	5038- 5051   210-	223   <u>16</u>	19 1
	1 20	1 20	1 363 1	5052+ 5065   224+	237   17	1 19
	•	1- 21	1 364 (	1 5066 5079 I 238	251 t 18	1 19 1
	1 22	1 22	1 365	5080- 5093   1-	14   1	1 20 1
	1 - 53	<del>&gt;3</del>	<u>1 :366∵-</u> 1	T 5094-"5107   T TF-		1 08 1
	1 24	1 74	1 367 1	5108+ 5121   29+	42   3	1 20 1
•	1 25	1 25	1 368 I	5122+ 5135   43+	56   4	1 03/2 1
	26	1 26	1 369 1	5136+ 5149   57+	70   5	1 20 1
	77	727	370 1	"5150+"5163   " 71+	84   " A	1, 50, 12
	20	1 28	1 371	5164- 5177   85-	98   7	1 20 1
	•	79	r 372 r	~~517X+~5191   ~~ 99=		1 20 1
	1 30	1 30	1 373 1	5192- 5205   113-		1 20 I
•	1 31	31	1 374 1	520h= 5218 / 127=	139 1 10	1 50 1

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

LANDSAT-2 FEB.1976

1								
	1	GMT I	FI TUHT	SPACE	CRAFT	REFFRENC	E I REF	I CYCLE I
	TOATE T	DAY	- DAY	BRB	ITS	BRBITS	TOAY	1" NO . TT
	7 -1 1	32 1	375	r 5219=	5232	1""140=153	11 11	1 20 1
	1 2 1	33 1	376	5233-	5246	1 154-167	1 12	1 20 1
	3 1	34	377	5247-	5260	168-181	1 13	1 80 1
	4	35	378	5261=	5274	1 182-195	1 14	1 20 1
	i 5 i	36	379	5275	-528 <b>8</b> -	196=209	15	7 20 7
	6	37 1	380	5289=	5302	1 210-223	1 16	1 05 1
		38 1	381	5303=	5316	[ 224 - 237	1 17	1 20 1
		39 1	382	5317-	5330	238-251	1 18	1 20 1
	9 1	40 I	383	5331-	5744	1 - 14	1 1	21 1
	1 10	411	384	5345-	5358	15= 28	1 2	71
		#2 1	385	" 5359 <b>-</b>	5372	79- 42	1 3	1 21 1
	1 12	43	386	5373=	5386	47- 56	1 4	1 21 1
	13	441	387	5387-	5400	1 57= 70	1 5	1 21 1
	14	45	388	5401-	5414	71 - 84	6	1 21 1
· ·	15	46 1	389	5415-	5428	1 85 - 98	1 7	1 21 1
	1 16	47	390	5429-	5442	99-112	i A	21
		48-1	391	5443	545A-	1113-126		7 21 "1"
	1 15	49 1	392	5457-	5469	1 127-139	10	1 21 1
***	1 19 1	50 (	393	5470-	5483	1 140-153	1 11	1 21 1
	1 20	51 i	394	5484-	5497	1 154-167	1 12	1 21 1
	7 21 1	- 52 T	395	1 549X=	5511	T 168-181	13	21
	1 22 1	53 1	396	5512-	5525	1 182-195	1 14	21
	23 "	54.1	397	5526-	5539	196-209	1 15	1 21
	24	65 I	398	5540=	5553	210-223	1 16	1 21 1
	1 25 1	56 1	399	5554	5567	1 224-237	1 17	î 21 l
	26	57 I	400	5568-	5581	238-251	1.8	1 21 1
	27 -	58 1	401	5582-	5595	1 14	1 1	1 25 1
	1 2h 1	69	402	5596-	5409	15- 28	1 2	1 22 1
	1 20 1	60 1	403	- SA10-	5623	20- 42	1 3	72 1

LANDSAT-2

			_ ••				<b>_</b>	
		•		SPACE	CRAFT 1	REFFRENCE	I REF I	CYCLF 1
	DATE	DAY	1	T- BRB	ITS	BRBITS '	I DAY I	N6 • TT
		61	T''' 404 '''	5624+	5637	1 143 € 56	. 4	
	1 2	45	1 405	5638=	5451	57- 70	1 5 1	55
	13_	~ 73	406	5652=	•••	71 = 84	1 6 1	55.
	/ <del>(</del>	64 85	407   408	5666 <b>-</b>   5680-	•	85+ 98 99+112		
	P	66	1 409	5694=		113-126	1 9 1	55
	j~ - <del>j</del> ~	67	410	5708-	5720	127-139	10	28
	1. 8	68	1 411	5721-		140-153	1 11 1	55
	1 9	69	1 412	5735		154-167	1 12 1	55
****	1 10 1	70 71	! 413 ! 414	5749=	5762   5776	168=181 182=195	1 13	22 T
	12	72	415	5777-	5790	196-209	1 15	55
	13	73	416	5791-	5204	210-223	1 16	55
	1 14	7.4	417	5805-	5818 1	224-237	17 1	55
	15	75	418	5819-	5832 T	238-251	1 18 1	55
	1 16 1	76	1 419 1 420	5833 <b>-</b>   5847 <b>-</b>	5846	1- 14	1 1 1	53
	1. 18	78	1 421	5861-		29- 42	3	23
	19 1	79	422	5875-	SARR I	43- 55	4	23
	20 1	AO.	1 423	5889-		57 <b>-</b> 70	1 5 1	53
	27	A1	1 424 1 1 425	5903 <b>-</b>	5916   5930	71 = 84 85 = 98	1 6 1	23
	1231		1 425 1426			99•112	a	-53 -
	24	84	1 427	5945-	5958	113-126	9 1	23
	1 25 I	ี	1 428	5959-	5971 1	127-139	1 10 1	53 1
	26' 1	86	429	5972-	5985	140-153	1 1 1	23
	1 25 I	. 87 . 88	430 ==   431	5986= 6000=	5999 L	154=167 168=181	1 12 1	53 I
	1 60 I		r 432 -		6027 7	182-195	1 14 1	23
	30		433	4028-		196-209	15	23
	1 31 1	91	1 434	6042-	6055	210-223	1 . 16 1	23

LANDSAT-2

"APR . 1974

	1						
	,	GMT	FIIGHT	SPACECRAFT	I REFERENCE	I REF   CYCLE	• • •
	DATE	T"DAY	TAY-T	BRBITS	TORRITS	• BN "TT" YAU T	1.
		92	435	6056- 6069	224-237	1 17 - 23	
	2	93	436	6070= 6083	238-251	18 23	- 1
		•		6084- 6097	1 1 14	1 24	4
i	•	95	438	6098- 6111	1 15= 28	2 24	1
	5	96	439	6117- 6125	79-7,2-	7 3 7 74	
	) (6 <sup>(3)</sup> )	97	440	6126- 6139	44- 56	1 4 1 24	1
	* *~~ <b>;7</b> * * * ;	98	1 441	6153 - 6153	l" 57= 70	1 5 1 24	- 1
. 4	A	9.9	442	6154- 6167	71 - 84	1 6 1 24	1
1	9	100	443	6168- 6181	85- 98	7 1 24	1
	<b>. 1</b> \bar{\bar{\alpha}}	101	444	6182 6195	99-112	1 8 1 24	- (
	77	105.1	4.5	"617h=" 6209"	T-117-126	9 1 24	.1.
	1.2	103	446	4510+ 6555	127-139	1 10 1 24	1
1	्राप्तः ।		4+7	4553 + 4534	1 140-153	1 11 1 24	1
. 1	14 (	1 105	448	6237- 6250	1 154-167	1 12 1 24	1
	• 3	7106	449	6251 - 6264	1 " 168-181	13   24	1
	16	107	450	6265- 6278	182-195	1 14 1 24	1
	17	108   T	451	~6279 <b>-</b> ~6292~	196-209	7 15 7 74	- T
1	18	109	452	4293 - 6306	1 21n=223	1 16 1 24	1
	19	110-	453	'6307= 6320	224-237	1 17 1 24	11
- 1	20 I	111	454	6321- 6334	238+251	1 18 1 24	1
	21	112	455	6335- 6348	1= 14	1 1 25	1.
1	22	113	456	6349- 6362	15= 28	1 21 25	1 -
	اا	4 2 4	467	"6363 <b>=</b> "6376"	79- 42	7 3 1 25	· · · · · ·
	24 1	115	458	6377- 6390	47- 56	1 4 1 25	į
77, 77	~ 25 · 1	116	459	6391- 6404	57- 70	5 1 25	10
1	20 1	117	460 1	6405 - 641A	71 - 84	1 6 1 25	1
	- 27	118	461 1	6419- 6432	° 85• 98	1 7 1 25	1 :
	2× 1	119	462	64433- 6446	99-112	1 8 1 25	- 1 -
1	79 1	120 1	. " " 463" " [ "	6447- 6460	117-126	1 9 1 75	1
- 1	30 1	121 1	464	6461- 6473	127-139	10 1 25	-1
•							

LANDSAT-2

#### MAY . 1 976

1		I GM	TI	FI IGHT	1	SPACES	CRAFT	1	REFERENCE	1	REF	I CYCLE
'	DATE	- DA	YT	DAY		688		一一	"BRBITS	-1-	DAY	1 No •
٠٠٠ ٢٠٠٠	1	" F 12	2 1	465	1.	64740		ī	140=153	1	11	25
1	2	1 12	3 1	466	1	648A-	6501	ş	154-167	1:	12	1 25
	- 3	1.15	4 "  "	467	7	4502-	6515	T	168-181	T	13	25
1	4:	1 12	5 i	468	1.	6516=	6529	1	182-195	- 1	14	25
1	5	7777	6	469-	7	-653n=	6543	7	196-209	- [	15	75
1	6	1 12		473	1:	4544-	6557	1	210-223	- 1	16	1 25
1	7	1 12	8 1	471	1	455X=	6571	1	224-237	1:	17	1 25
1	, A.	1 12	9	472	1	6572-	6585	i	238-251	1:	18	1 25
	9	1 13	0 1	473	1	6586-	6599	ł	14	1	- <b>1</b>	1 26
. 1	:10	1 13	1	474	1	6600-	6413	i	15- 28	1	2	1 56
	71	1 13	5. 1.	475	- T-	~6614=	6627	1.7	79- 47	- 11	3	76
1	12	1 13	3	476	ı	4654ª	6641	1	43= 56	1	4	1 26
1	13	1 13	4 1	477	†	6642-	6655	1	57= 70	1	5	1 26
	14	1 13	5	478	1	6656=	6669	1	71- 84	- 1	6	1 : 26
· 1	15	1 13	6 1	479	1	6670-		1-	85- 98	- 1	7	76
1	16	1 13	7	480	1	6684-	6697	1	99-112	1:	A	1 26
_	17	1 13		481		~K698+~	6711	_	7113-126	1-	9-	1 59
1	18	1 13	9 1	482	1	6712=	6724	1	127-139	- 1.	10	1 26
71	19	1"14	- ,	483	1 -	6725-		1"	140=153	Γ.	11	1 26
1.	20	1 14	1	484	ł	6739-	6752	1	154-167	1.	12	1 56
	21	1114		485	1	6753=		1 -	168-181	- 1	13	1 56
1	22 -	1.14	3	486	1 1	6767-		1	182-195	1	14	56
	-53 -	-1-14	4	487		~6781 ==		-+	196-209	-1	1,5	
1.	24	1 14		-488	ı	6795-		1	210-223	- 1	16	1 26
-1	25	11.14	- ,	489	1	6809-		Γ	224-237	1	17	26
. 1 .	26	1 14	- ,	490	1	6823+		1	238-251	- 1	18	26
1	27	1 14		491	1	6837-	6850	t	1 4	- 1	1	27
ı, į	28	1 14	- •	492	ļ	6851=	6864	ŀ	15- 28	ł	2	1 27
	. 58. ~	1 15		493		"A865="		1	29- 42	, t	3 .	[27
	30		1 1	494	1	6879-	6492	1	47- 56	. 4	4.	27
1	31	1 15	2 1	495	1	6893ª	6906	1	57- 70	11	5	7 27

LANDSAT-2

JUNA 976

1		1	GMT	ŧ	FI IGHT	1	SPACE	CRAFT	1	REFFRENC	E I	REF	I CYCLE I
	DATE	T-	DAY	1	DAY	1	<del>0</del> RB	TS	-1-		I.	DAY	1 NO
-													
1		1	153	+-	496	1 -	-4907-	-6920	1	71="84	- 1	- 6	1 27 ···
- 1	2	1	154	1	497	1	4921-	6934	1	85 - 98	1	7	1 27 1
1	3	T.	165	ı	498	1	16935-	6948	1	99-112	1.	異	1 27
1	4	1	156	i	499	ŀ	4949-	6962	1	113-126	1	9	1 27
	5	T	157	$\top$	500	T	-F36X	6975	T	127-139		10	27
- 1	6	i	158	1	501	ŧ.,	6976-	6989	f	140=153	1	1 1	27
1	· · · · · · · · · · · · · · · · · · ·	7	159	r	502	1	6990•	7003	1	154-167	. 1	12	) 27
· , 4	8	1	160	ŧ	503	1	7004=	7017	1	168-181	1	- 1 3	27
	···· 9 ···		161	Ţ	504	1	7018-	7031	1	182-195	. 1.	14	27
1	10	ı	162	1	505	1	7032-	7045	ļ	194-209	1	15	1 27
	11	-1	163	7	506		7046=	7059	-ī -	210-223		16	27
- 1	12	1	164	ı	507	1	7060-	7073	1	224-237	1	17	27
1.7	13	1	165	1	508	1	7074-	7087	1	238-251	ļ	18	27
1.1	14	1	166	1	509	1	708A=	7101	- 1	1 = 14	í	1	28
1	15	T	167	1	510	1	7102-	7115	T	15- 28	- 1	2	1 - 58
. 1	16	1	168	1	511	1 -	7116=	7129	i	29- 42	- 1	. 3	1 28
	17	-	169	1	512		<b>-7130-</b> -	7143	-1	₩ 56	- r	4.	85
	18	1 '	170	1	513	1	7144-	7157	1	57- 70	1	5	1 28
		•	171	1-	514 ***	1	715%-	7171	-1-	71 - 84	T	K	1 28
ŧ	20	1	172	ŀ	515	1	7172-	7185	ļ	85- 98	- 1	7	1 28
1	21	•	173	T	516	1	7186=		1-		L.	R	28
1	22	•	174	ŧ	517	1		7213	1	113-126	1	9	1 28
	53	•	175	1-	518	1	7214-			127-139		10	
1	24	•	176	i	519	1	7227-	7240	1	140=153	1	11	1 28
-1	25	•	177	1	520	1.	7241-	7254	1	154-167	1	12	1 28
	26		178	1	521	1	7255-	7268	1	16R=181	ł	13	1 28
	27		179	1	525	T	7269	7282	1.	182-195	1	14	1 28 1
- 1	28	,	140	F	523	1	7283=	7296	1	196-209	1	15	28
1	29	•	TR1	T	도 24	1	7297•	7310	1	210-223	ı	1.6	
	30	1 :	142	1	52 <b>5</b>	1	7311-	7724	1	224-237	- 1	17	i 28 i

LS-2

LANDSAT-2

JUL . 1976

	1	I GMT I		SPACECRAFT	REFFRENCE	I REF I	
	TDATE	TOAY	DAY	BRBITS	BRATTS	1 DAY 1	NB •
	1 (	1183.1	526	7325- 7338	738-251	T 18 F	28
	1 2	1 184 1	527 L	7339- 7352	1 14	1 1 1	29
	3-	T 185 T	528 1	7353- 7366	15- 28	L S 1	29 1
	1 💆	1 186 1	529	7367- 7380	29- 42	1 3 1	29
	1 3	1 1 X 7 1	- 530-T	7381-7494	A3- 56	7	58
	i <u>f</u>	1 188	531	7395- 7408	1 574 70	1 5 1	29
	7	1 189	532	7404- 7422	75= 84	1 - 6 1	29 1
	1 8	1 190	533 (	7423- 7436	85÷ 98	7 1	29
	1. 9	1 191 1	534 1	7437- 7450	99-112	7 8 1	29
	1 10	1 192	535	7451- 7464	1113=126	1 9 1	59
	1	1937	536	7465- 7477	127-139	1 10 1	29
	1 12	1 194	537	7478- 7491	1 140+153	1 11	
	13	1 195 1	538 (	7492- 7505	1 154-167	1 12 1	59
	1 14	1 196 1	539 I	7506- 7519	1. 168-181	1 13 1	29 I
	T 15	1 197 1	540 [	7520+ 7533	1" 182-195	1 14 1	79
	1 16	1 195	541	7534- 7547	196-209	1 15	29
	1 17	1 199 1	542	~_7548•~7561~	T_ 510-553	T- 16 T	
	1 18	1 200 1	543	7562= 7575	224-237	1 17 1	29
	T 19	1 201 1	- '54 <u>4</u> ' ' 1	7576+ 7589	1 238-251	T 18 T	29
	1 20	1 505 1	5+5	7590- 7403	1 = 14	1 1 1	30
·	1 21	1 503 1	546 1	7604- 7617	15- 28	1 5 1	30 1
	1 22	1 204 1	547	7618- 7631	29- 42	3 (	30 1
	1 23	ナーラロラーナー	548	<b>~7637</b> ≠ 7645	T *** 44 =* 56****	7 4 1	30 t
	1 24	1 206 1	549	7646- 7659	57- 70	1 5 1	30 1
	7 25	1 207 1	550 1	7660- 7473	71 - 84	1. 6.1	30
	1 26	1 208 1	551	7674- 7687	1 A5- 98	7 1	30 1
	1 27	1 209 1	552	768x= 7701	99-112	1 8	30
	1 24	1 210 1	553	7702- 7715	113-126	9 1	30 1
	T_54	1.511.1	554 T	~ <b>77</b> 16- 7728	127-139	1 10 1	30. 1
	1 30	1 212 1	555	7729- 7742	140-153	1 11 1	30 i
	) 31	1 213 1	55 <b>6</b>	7743- 7756	154-167	1 12 1	30

LANDSAT-2

#### AU3.1976

- 1			I FI IGHT	CDAC	CRAFT	DE				- CVC  C
	E .	I DAY			SITS		FFRENC			CYCLE - No
	UATE	LOAT	I DAT	J 083	0118				. T	NU •
	1	1 214	557	7757	~7770	1 1	68-181	77.77.1	3 (	30
1	2	215	558	7771	7784	1 1	F2-195	1 1	4 1	30
	3	1 216	559	7785	7798	1 1	96-209	· · · · · 1	5 1	30
1	4	1 217	560	7799	7812	2	10-353	1 1	6 1	30
$\top$	5	1 218	561	7813	77776	1 2	24-237	1	7 1	30
i	6	1 219	562	7827	7840	1 2:	38-251	1	8 1	30
- 1	7	1 220	1 563	7841	7854	1 :	9- 94	1	1 1	31
1	· 8	1 221	1 564	7855	7268	1 1	15- 28	1	2 1	31
Ť	9	1 222	565	7869	7882	1	29- 42	1	3 (	31
i i	10	1 223	566	7883	7296	1	43- 56	1	4 1	31
		224	567	7897	7910	y	57- 70	. 1.	5 1	31
i	12	225	568	7911	7924	1	71 - 84	i	6	31
1	13	1 226	1 569	7925	7938	1.	85- 98	i i	7	31
i i	1.4	1 227	570	7939	7952	i i	99-112	i	8 i	31
<del>i</del> -	15	228	571	7953	7966	1 1	17-176	i	9 1	31
i	16	229	572	7967	7979		27-139	i 1	0 i	31
	7	1-230-	573	7980	7993	1 1	40-153	1	1- 1	31
i	18	231	574	7994	8007		54-167	i 1	2	31
	19	232	575			1-1	68=181	i 1	3 1	31
	20	233	576		8035	,	82-195		4	31
	21	234	577		8049		94-209	i 4	5 i	31
i	22	235	578		8063		Iñ#223	• -	6 1	31
		236	579-		8077	:	4-237	• • •	7 1	31-
	24	237	580		8091		38=251	,	8 1	31
;	25	238	581	T 8092	-	1 11	1 - 14		1 1	32
- 1	26	1 239	562		8119	1	1 28	1	2 1	35
	27	240	563		8133	•	9- 42	.	3 1	35
	26	241	584	8134			43 = 56	1	3 ! 4 i	32
	- 29	242	1 585	7 7 7 1 4 X 4 X 4 X 4 X 4 X 4 X 4 X 4 X 4 X 4		•	57 <b>-</b> 70	i	5	32
. !	30	1 243	1 566	,	6175	•	71 = 84			32
1						•		Į.	6 1	
1	31	1 244	1 567	I AI/h	8189	1	45 9 9 R	1	7 1	35

B-9

LANDSAT-2

SEP, 1976

			:												
. 1	1	GMT	F	IGHT	SP	ACEC	RAFT	RE	FFRF	NCE	1	REF	ł	CYCL	E
DAY	F	DAY	T [	DAY	Τ	0831	7.5	T	FRE	TS	-1	DAY	Hi,	. NB •	1
		245		588	, R1	90-	8203		99-1	12		8	 	32	
1 2		246	i	589	82	34=	8217	1 1	1-1	26	i	9	1	32	1
···i- 3	•	247	1	590		_	8230	, ,	27-1		- 1	10		32	
4	•	248	i	591		-	8244	, -	40-1		í	11	1	32	
<del></del>		249	,	592-			8258		54-1		<del>-</del>	112	ci.	32	
6	•	250	i	593			8272		68=1		- 1	13		32	
		251	ŀ	594			8286		85=1	•	í	14		. 35	
. 8	•	252	,	595			8300		96-2		ì	15		32	•
9	•	253	1	596	•		8314		10=2	_	i	16	1. 1	32	
10		254	;	597	. –		8328		24-2	_	1	17	i	35	
	•	255	·	-598	,		8342		38-2			18	Ιi	32	
12	•	256	i	599	•		8356	i -		14	í	1	i	33	
13		257	i	603			8370	; -		28	1	2	1	33	
1 14		258	1	601	,		8384	•		42	i.	3		33	,
15		259	r ·	602			8398	•	43-	56	i -		1	33	
1 16	•	260	i	603		99-	8412	•	57-	70	i	5	. ,	33	
<del>    7</del>	•	261-	<del></del>	-604		-,	8426-			-84-		6	i	33	
1 18		595		605	•	27-	8440	•	1 1	98	i	7		33	
19	-	263	<u> </u>	606		41-	8454		99-1		1	ģ	i	33	
1 20		264	;	607			8468		12-1		•	9	i	33	
	•	245	1	608		69-	8481		27-1		i	10	ı.	33	
25		266		609		82-	8495		4 O = 1		÷	11	, .	33	
7 23	•	267	<u> </u>	61 <del>0</del>	, ,, ,		8509		54-1		·	12	t in the c	33	
1 24		268	1	611			8523		74 T		1	13		33	
25		249 ·	ļ	612			8537		82=1			14	,	33	
1 26		270	1	613		7	8551		96-2		,	15	1	3.3	
27	•	271	f \$	614		-	85.65		10-2		1 -	16	;	33	
1 24		272 272	1	615	•	66-	8579		24-2		1	17	1	33	
	151 1 Table 185 1	273	1	_615 ~615 ~	•	80-	8593		7X-7		- 1	18	- [	.∵:33 33	
			;					1 6		-		- 10	.1		
1 30	1	274	1	617	I KD	94-	8407	I .	1 =	1.4	ı	. 1	- 1	34	1

LANDSATES

"HCT . 1976

1		GMT I	FITGHT I	SPACECE	RAFT I	REFFRENCE	I REF. I	CYCLE I
	DATE	DAY	DAY		75	PRBITS	IT DAY TO	- NB •
						*****		
		775	618	8608-	8621 1	15- 28	L - 5 1.	34
	۶	276	619	8622-		29- 42	3 1	34 !
		277	- 650i	- 8636+ 1		***43= 56	4	34
	4	278	621	8650 - I		57- 70	5 1	34 1
		779	622	R664-		71 - N4		34
	6	280	623	8678=		85- 98	7 1	34
	7	1 281 1	624 I	2692+ 3		99-112	Ŕ	34
	Á	282	625		8719 L	113-126	9	34
	9	1 243 1	625	-	8732 I	127-139	10	34
		• • • •	627		8746 I	140=153	1111	34
	10	1 284 1		8747=		- 154=167 ·	12	34
	17	1 284 I	629 I		676U : 8 <b>774</b> i	168=181	13:1	34
	12	1 286 1				•	1 14 1	
- 1	13	287	630		8788	182-195		34   1
· 1	14	1 288 1	631		8802	196-209	15	34
	15	1 289 1	632 1	-E089		210-223	1 16 1	34
	16	1 590 1	633	-,	8830	224-237	1 17 1	34
	17	L5311	634	8831-	•	238-251	18	34
!	18	1 292 1	635		8458	1 - 14	1 1 1	35
1	19	1 593 1	- 636 1"		8872	15+ 28	l SI	35
· · · · · · · · · · · · · · · · · · ·	20	1 294 1	637	8873- I		29- 42	3 1	35
	71	295	636 -1	-88 <b>8</b> 7=		~ 43= 56 °	1 4 1	35
. 1	22	1 296 1	639	8901-		57= 70	( 5	35
	~>3~~~	t- 297-t	6401	~~ <del>8915=</del> ~	8928-1	71 •×4····	1 e . 1	· 35 · t
1	24	1 298 1	641		8942 1	85 98	1 701	35
·	25	1 299 1	642	×94%= (	8956-+	99-112	8 1	35
1	26	1 300 1	643	8957 <b>-</b>	8970	113-126	9 1	35
	27	1 301 1	644 1	8971=	8983	127-139	t 10 t	35
- 1 - T	28	1 302 1	645	89 <b>34</b> = 1	8997	140=153	11 1	35
1	···>9	1 303 1	646 1	~ ×99×= 1	901 t ~ 1	154-167	1 12 1	35
1	30	1 304 F	647	9012-	9025	168=181	1 13 1	35
1	31	1 305 1	648	9026-	9039 1	182=195	1 14 1	35

LANDSAT-2

NUV. 1976

	1	I GMT I	FI TGHT	SPACEC	RAFT	REFFRENCE	I REF I	CYCLE
i	DATE	TOAY	DAY	5R31			I DAY T	NB .
	*	1 306 1	649	9040=1	9053	194-209	1 15 1	35
	?	1 307 1	650	9054-	9067 1	210-223	1 16 1	35
	3	1 308 1	651	9068-	9081	224=237	17 1	35
1	4	1 309 1	652	9082-	9095	238+251	1 18 1	35
	5	7 310 1	653	9096	9109	1 = 14	177	36
· •	6	1 311 1	654	9110-	9123	15= 28	1 7 1	36
1	7	1 312 1	(655)	9124-	9137	. 59 - 42.	1 3 1	36
	A	1 313 1	656	9138-	9151	43- 56	1 4 1	36
1	79	1 314 1	657	9157-	, , , , ,	57- 70	1 5 1	36
	10	1 315 1	<u>,656</u> )	9166-	,	71 - R4	1 6 1	36
1	4.4	1 316 1	" 6b9 T	9180-		" 85 <b>-</b> 98	1 7 1	36
	12	1 317 I	660	9194-		99=112	1 8 1	36
1	13	1 318 1	661	9208-		117-126	1	36
•	14	1 319 1	662	9555-		127-139	1 10 1	36
1	15	1 350 1	663	9235-		140×153	1 11 1	36
- 1	16	1 321 1	664 1	9249-		154=167	1 12 1	36
	77	1 355	665	9263**	,		77713 L	36
- 1	18	1 323 1	666	9277-		182-195	1 14 1	36
	19	1 324 1	667	9291-		196-209	1 15 1	36
	20	1 325 1	668	9305-		210-223	1 16 1	36
-1	21	1 326 1	669	9319-		224=237	1 17 1	36
, ,	22	1 327	670	9333-		278-251	1 18 i	36
		1.358.1	671	9347-		14	1 1 1	37 1
<u>.</u>	24	1 329 1	672	9361-		15∞ 28	5 1	37
7	25	1 330 1	673	9375-		29= 42	1 3.1	37
į	26	1 331 1	674	9389•	,	47- 56	F 4 1	37
	- 27	1 335 1	675	9403-	- , ,	57- 70	1 5 L	37
ŀ	28	1 333 1	676		9430	71 - h4	1 6 1	37
7	79	1 334 1	677		9644 ["	85 98	7 1	37
i	30	1 335 1	678	9445=	9458 1	99-112	1 8 1	37

LANDSAT-P

1		I GMT	I FI TOHT	1	SPACE	CRAFT	1	REFFRENCE	I R	EF I	CYCLF	Ī
	DATE	TOAY	TOAY		683	TIS	1	TARBITS	7 0	<b>A Y</b> ="]	N.E.	
							:					
	· ·	1 336	1 679	-1	9459-		1	113-126	i	9 1	37	1
. 1	2	1 337	1 680	t	9473-		1	127-139	1	10 +	37	F
L	3	338	F 681	1	9486	9499	1	140=153	1	11	37	1
1	4	1 339	1 682	1	9500-	9513	1	154-167	1	12 1	37	1
	5	7 340	683		9514-	<del>"95</del> 27"	-1-	TEX-181		1377	37	T
1	- 6	1 341	684	1	952×=		1	182-195	1 .	14	37	1
. 1	7	342	685	i	9542	9555	1	194+209	1	15 (	37	1
I .	, 8	1 343	1 686	1	9556-	9569	1	210-223	1	16 1	37	1
F	9	344	687	Ţ	3570-		1	224-237	1	17 1	37	.   1
1	<b>1</b> ()	1 345	1 658	1	9584=	9597	1	238-251	1 :	1 A	37	- 1
r	1.4.4	1 346	1 689	_1	959ו	9411	T.	7 - 14	٠, ١	1.77	38	. 1
1.	12	1 347	1 690	1	9612-	9425	1	15- 28	1	2 1	38	1
1.	13	1 348	691	ŀ	9626-	9439	1	29- 42	1	3	38	1
1	14	1 349	1 692	- 1	9640-	9653	1	<b>43</b> ● 56	1	. 4 ‡	38	ı
	15	1 350	1 693	1.	9654-	9467"	1	57- 70	1	5 1	38	1
	16	1 351	694	1.	9654-	9481	1	71 - 84	1	6 1	38	1
T .	17	7-352-	695		7682=	9495	1	7777 AS = 7798	. 1	7 1	38	-1.
1.1	18	1 353	696	1:	9696-	9709	1	99-112	1	8 1	38	t
1	19	354	1 697	t	9710-	9723	1	·** 113=126	1	9 1	38	. 1
1	20	355	698	1.	9724-	9736	1	127-139	1	10 1	38	1
- T	21	356	699	1 -	9737-		1	140-153	1	11   1	38	- 1
1	22:	1 357	700	1	9751-	9764	1	154-167		12/1	38	1
	73	1 358	701		9755=		Γ.	168=181	7-	13	38	- 1
1	24	359	702	ļ	9779-		1	182-195	•	14	38	-1
	25		r 703	1	9793-		1	196-209	1	15	38	-
1	26	1 341	704	J	9837-	9820	Į.	210-223	1 .	16 🕕	38	ł
	27		705	. 1	9821-		I	224-237	•	17 1	. 38	ı
	28	1 363	706	1	9835-		1	238=251	1	18 🗆	38	- 1
	29	1 364	707	1 -	9849=	9262	1	1 - 14	1	1 1	39	1
- 11	30	1 345	708	1	9863-	9476	ŀ	15= 28	1 .	5 1	39	: 1
1	21	1 366	709	1	9877-	9890	1	29= 42	: 1	3 1	39	-1

LANDSAT-2

	1	GMT 1	FI 1GHT	SPACECHAFT	1 REFERENC	F I REF	I CYCLE I
	T DATE	TOXY	DAY	BRBITS	TTTBRRITS	DAY	N8 . 1
	• • • • • • •						
	1 1	1 1	710	9891- 9904	1 43 56	1 4	1 39
	1 ?	1 5 1	711	9905- 9918	1 57 70	1 5	
	3	3 1	712	9919- 9932	1 71 - 84	1	1 39
	<u>. 4</u>	l <u>a ∯</u> []	713	9933- 9946	I 85 ■ 98	1 7	1 39 1
	5	5	714	9947-79960	311-66	* "   <b>*</b>	1 39 1
	1 6	6 1	715	9961- 9974	1 -113-126	1 9	1 39 1
	1 7 1	7	716	9975- 9987	1 127-139	1 10	1 39 1
	, ,	8 1	717	- 998x=10001	1 140-153	1 11	1 39 1
	1 6 1	9	718	10002-10015	1 154-167	1 12	39
	1 10 1	10 1	719 (	10016=10029	1 168=t61	1 13	39
	1	717	720- "1	"1"np3n+1nn43	1 - 182-195	11 14	39 1
.	1 12 1	12	721	10044-10057	1 196-209	1 15	39
	1 13 1	13	722	10058-10071	1 210-223	1 16	39
1	1 14 1	14	723	10072-10085	1 224-237	1 17	39
	L42 1	15 1	724	10036-10099	1 238-251	18	39
1	1 16 1	16 1	725	10100-10113	1 1-14	1 . 1	40
	77	77	726	10114-10127	15- 28		40
	i, <b>1</b> ,8 i	18	727	1012h-10141	29- 42	13	1 40 I
	Jan 148 at	19	728	10142-10155	1 43= 56	1 4	1 40 -1
1	1 20 1	20 1	729	10156-10169	1 57- 70	1 5	1 (40) 1
	P1 1	21 1	730 1	10170-10183	71 - 84	1:6	1 40 1
ı	1 22 1	25 1	731	10184-10197	1 85= 98	1 7	40
	23 <u>-</u>	231-	- 732-1	""#019x#102#1"	1 99=112	- I 8	40
	24 1	24 1	733	10212-10225	1 113-126	1 9	140 V
1	75 L	25	734	10226-10238	1 127+139	1 10	40 1
1	26 1	26 1	735	10239-10252	1 140-153	1 14	40 1
	27	27	736	10253-10266	1 154-167	1 12	40 1
17 - 1	25 1	28 I	737	10267-10280	1 168-161	13	40
	79 1	. 29 1	738	10281-10294	182=195	1 14	40 - 1
1	30 1	30	739	10235-10308	194-209	1 15	40
1	31	31	740	10309-10322	1 210-223	1 -16	40
•				********			~~~

LANDSAT-2

i	1	GMT	FI IGHT	1	SPACEC	RAFT	I REFF	RENCE	1	REF I	CYCLE	1
Т	DATE	TOAY	DAY	T	CRBT		TTT ER	BITS	7	DAY	TNB.	7.
			·								, 	
	- + -	1 32	741	7. 1	0323-1	0336	1 - 224	-237	- 1	17 (	4.0	1
ì	2	1 33	1 742	1 1	0337-1	0350	1 238	-251	- 1	18 (	40	1
i	3	7 34	743	1- 1	7351-1	4450	1	- 14	i i	1 1	41	1
i	4	35	744	1 1	0365-1	0378	1 15	- 28	i	2 1	41	1
	5	36	745		0379-1	0392	779	42-		3 1	41	<del>-</del>
	6	37	746	1 1	0393-1	0406	1 43	<b>-</b> 56	ì	4	41	i
	7	38	747	1 1	0407-1	0420	57	- 70	ī	5 1	41	4
i	- B	39	748		0421-1		71	<b>- 54</b>	i	6 1	4 1	ĺ
	9	1 40	749	1 1	0435-1	0448	1 85	- 98	i	7 1	41	1
	10	1 41	750	1 1	0449-1	0462	99	-112	Í	R 1	4.1	1
·i	4 1	42	751		0463-1		· -113	-126	1	9 1	41	1
	12	4.3	752		0477-1	_	1 127	-139	i	10	41	i
i	- 13	44	753	, ,	0490-1	• • • • •		-153	i	11	41	ì
i	14	45	754		0504-1			-167	i	12	41	i
· · · r	15	1 46	755		0518-1	-		-181	i	13	41	
i	16	47	756		0532-1			-195	i	14	41	i i
		48-			0546-1		1-196	-209	ı	-15		11
	16	1 49	758		0560-1		1 210	-223	1	16	4-1	1
	19	i 50 -	759	1 1	0574-1	0587	1 224	-237	i	17 /	41	i
	20	51	760		0588-1		238	•25f	1	18	41	i
· · · · i	21	52	761	1 1	0602-1	0415	1	- 14	İ	1 1	42	1
· i	22	53	762	1 1	0616-1	0429	1 15	<b>-</b> 28	1.	2	42	1
·	- 23	1	763 -	-11	0630=1	0643	1	- 42	<b>T</b>	-31	- 42	1.
	24	1 55	764	1 1	0644-1	0457	43	• 56	1	4 1	42	
i	25	56	765	1 1	0654-1	0471	1 57	- 70	Ť	5 1	42	Ì
1	26	1 57	766	1 1	0672-1	0485	7.1	<b>₩</b> 84	. 1	6 1	42	
		r: 58	767	1-1	0686=1	0699	1 85	<b>9</b> 8	i	7 1	42	1
i	24	59	768	1.1	0700-1	0713	1 99	-112	- 1	A i	4.2	ı

I ANDSATES

MARL 977

i			A.P.
1	GMT I	I TUHT I	SPACECRAFT   REFFRENCE   REF   CYCLF
DATE	TOAY	ו אלט	SRBITS T SRBITS I DAY I NO.
	60	76 <b>9</b> i	10714-10727   113-126   9   42
6	61	770	10728-10740   127-139   10   42
3	62	771	10741-10754   140-153   11   42
1 4	1 63 1	772	10755-10768   154-167   12   42
	1 6.4-1		<u> </u>
1 6	65	774	10783-10796   182-195   14   42
1 7	1 66 1	775	10797-10810   194-209   15, 42
1 8	67   °	776	10811-10824   210-223   16   42
9	1 68 1	777	10825-10838   224-237   17   42
1 10	69 1	778	10439-10452   238-251   18   42
	70	779	10853910866   [ 19 19 14 ]   1   1   43
1 12	71	780 1	10857-10880   15= 28   2   43
13	1 72 i	781	10881-10894   29- 42   3   43
1 14	73 1	782	10895-10908   43- 56   4   43
15	74 1	783	10909-10922   57-70   5   43
1 16	75	784	10923-10936   71-84   6   43
	76	785-1	-10937-10950   85- 98- 17   -43-
1 18	1 77 i	786	10951-10964   99-112   8   43
19	78 1	787	10955-10978   113-126   9   43
20	79	788	10979-10991   127-139   10   43
121	1 80 1	789	10992-11005 1 140-153 1 11 1 43
1 22	61	790	11006-11019   154-167   12   43
	i×2i	791 -i	-11020-11033 T- 168-181 T-13-T -43-
24	1 ×3 1	792	11034-11047   182-195   14   43
25	1 84 1	793	1104x=11061   196=209   15   43
26	. 55 l	794	11062-11075   210-223   16   43
27	1 A6 1	795	11076-11089   224=237   17   43
1 28	87	796	11090-11103   238-251   1
29	1 .07 1 1 88 1	797	11104-11117   11-14-11-1-44
1 30	1 89 1	798 i	11118-11131   15- 28   2   44
1 31	1 90 1	799	11132-11145   29- 42   3   44
1 51	1 70 1	/33 (	Tilesation i sas ac i p i aa

LANDSAT-2

J			FITGHT		I REFERENCE	I REF I	CYCLE
	PATE	TUTOAY	DAY	PTIENE -	BRBITS	I DAY	N8
•• ••••••		91	**********	11146-11159	1 TO 1434 56		
;		1 92 1	801	11160-11173			44
. ;	3	93 1	802			1 5 L	44
. !	4	94 1	803	11174-11187		6 1	44 1
	5	1 77 ! 1 95 T	804	11184-11201	* * * * * * * * * * * * * * * * * * * *	1 7 1	44 1
		96.	,	771202-11215		8	44
!	7	1 90 1	805	11716-11779		9-1	-144
		, ,	806	11230-11242		1 10 1	44 [
	, <u>, , , , , , , , , , , , , , , , , , </u>	1 98 1	807	11243-11256		1 11	. 44 . ]
	- 9	1 99 1	808	11257-11270		1 12 1	. 44
. 1	10	1 100 1	- 80 <b>9</b>	11271-11284		13 1	44 - 1
- 1	11	1 101 1		11235-11298		1 14 1	44
- 1	12	1 105 1	811	11239-11312		1 15 1	44 [
. 1	13	1,403 1	812	11313-11326	1 210-223	1 16 1	44
1	14	1 104 1	813	11327-11340	1 224-237	1 17 1	44
	15	1 105 1	814	11341-11754	238=251	181	44
	16	1 106 1	815	. 11355-11368	1 - 14	1 1	45 i
1	17	r 17777	816	11369-11382	**************************************	7 7 1	45
İ	15	1 106	817 j	11383-11396	29= 42	1 3 1	45
	19	1 109 1	818	11397-11410	1 43- 56	4	45 1
1	20	110	819	11411-11424	1 57= 70	5 1	45 i
1	21	111	820	11425-11438	71 - 84	1 6 1	45 I
1	22	112	821 (	11439-11452	1 85= 98	7 1	45 1
1	23 -	1113	- 822		99-117	் க்	45
1	24	114	823	11467-11480	113-126	9	45
1	25	115	824	11481-11493	1 127-139	1 10	45
1	26	116	825 i	11494-11507	1 140=153	1 11 1	45 1
- j	27	117	826	11508-11521	1 154=167	12	45
	24	118	827	11522-11535	1 168=161	13	45 I
7	27 1	119	828 1	11536-11549	1 182-195	141	45
		120	829	11550-11563		15	45 I
_					1 1787717	1 47 1	<b>⇒</b> □

LS-2

LANDSAT-2

ı	-	I GMT I F		SPACECRAFT I	REFFRENCE	REF	CYCLF
T	DATE	J-DXY-I	ואַגַּנַיַ.	BRBITS	GRBITS	TOAY"	No •
•							
1	1	1 121 1	830 1	11564-11577	510-553	16	
ł	7	1 122 1	- 831	1157x-11591	224-237	17	45
İ		1 123 7	.835	~ 11592=11405°  °	238-251	18	<b>45</b>
ŧ		1 124 1	833	11636-11619	1 = 14	1 3 (	46
1	5	1 1 25	734 T	11620-116337	15- 28	) ·	*****
ŀ	6	1 126 1	835	11634-11647	29- 42	3 1	46
٠Į	7	1 127 1	836 1	11648-11661	47= 56	(4-)	46
ı	K	1 128 1	837	11662-11675	57- 70	5	46
` }	9	1 129 1	838	11676=11689	71 - 84	6	46
1	10	130	839	11690-11703	85 <b>=</b> 98	7 1	46
T		1"131 F"	840° T	11704-11717 1	99-112	) ' ' ' ' ' ' ' ' ' ' ' ' '	- 46
1	12	1 32 1	841	11718-11731	113-126	9 1	46
1	13	1 133 I	842	11737-11744	127-139	10	46
1	14.	1 134 1	843	11745-11758	140-153	11	46
-	15	1 135 1	844 T	11759-11772	154=167	121	- 46
Į.	16	1 136	845	11773-11786	168-181	13	46
+	17	1-137-1-	846-1	<del>~11</del> 787=11800	-182-195	14	46
. 1	15	1 138	847 1	11801-11814	194=209	15	46
1	19	1 139 1	848 1	11815-11828"	21h=223	16	46
	20	1 140 1	849	11829-11842	224-237	17 1	46
ì	21	1 141 -	-850   1	~11843=11X56 []	238-251	18 1	46
J	22	1 142 1	851 i	11857-11370 I	1- 14	1 1	47
-t	···->3	<del> </del>	852+	~118 <b>7</b> 1=11×84 ~†~	- '+5 • 281	- 2	
	24	1 144	853	11885-11898	29- 42	3 1	47
1	25	1 145 1	854	11899-11912 1	44+ 56 I	4 1	47
ı	26	1 146 1	855	11913-11926	57= 70	5 1	47
1	27	1 147 1	856 1	11927-11940 1	71 - 84	6 1	47
1	28	1 148	857	11941-11954	85. 98	7 1	47
٠,	29	F-149-1	858 · 1	11955-11968 1	~ 99-112 1	8 1	47
1	30	1 150 1	859	11969-11982 1	113=126	9.1	47
T	31	1 151 1	860	11983-11995	127-139	10 1	47

LANDSAT-P

JUN: 1977

1-2							
	1	I GMT I	FIIGHT	SPACECRAFT	I REFERENCE	I REE I	CYCLE I
	DATE	DAY	DAY	0K81T5-	BRBITS	TOAY	- NO •
	† • • • •	1 152 1	861	11996-12009	1 140-153	111	47 1
	2	1 153	862	12010-12023	1 154-167	1 12 1	47
	3	1 154 1	863	12024-12037	1 168=151	1 13 1	47
	1 4	1 155	864	12034-12051	1 182=195	1 14 1	47
	<u></u>	11561	865	72052-12065	194-209	15 1	47
	6	1 157 1	866	12066-12079	210-223	1 16 1	47
	7	T 158 I	867	12080-12093	224-237	1 17	47 1
	8	1 169 1	868	12094-12107	238-251	1 18	47
<del>-</del>	9	1 160 1	869	12108-12121	1- 14	1 1	48
	1 10	1 161 1	870	12122-12135	15- 28	1 2 1	48
	111	T 762 T	871	12130-12149	29- 42	3   3	48
	1 12	1 163 1	872	12150-12163	43= 56	1 4 1	48
+ 1	1 13	1 164 1	87.3	12164-12177	57= 70	1 5 1	48
	1 14	1 165 1	874	1217h-12191	71 - 84	1 6 1	48
	15	1 166	875	12192-12205	A5= 98	7 1	48
	1 16	1 167 1	876	12206-12219	99-112	8	48
	7	7"168"	877	12220-12233	113-126	-1 9 1	48 1
	1.8	1 169 1	878	12234-12246	1 127-139	10 1	48
	19	1 170 1	879	12247-12260	140-153	1 11 1	48 [
	20	171	880	12261-12274	1 154-167	1 12 1	48
	21	1 172	881 1	12275-12288	1 168-181	1 13 /	48
	22	1 173	882	12289-12302	1 182-195	1 14 1	48
	153	7-174 1	883 ~ 1	12303-12316	1 7 96 - 209	цт. <b>1</b> 5 ја	48 1
	24	1-175	884	12317-12330	1 210-223	16	48 1
	25	1 176 1	885 1	12331-12344	1 224-237	1 17 1	48 1
	1 26	177		12345-12358	238-251	1 18, 1	48
	1 27	1 178 1	887	12359-12372	1 1- 14	1 1	49
	1 28	1 179	888	12373-12386	15= 28	1 3 1	49 1
	159	1 1 1 0		12387-12400	1 29- 42-	1 3 4	49
1.4	1 20	1 181 1	890	12401-12414	1 47- 56	1 4 1	49

B-19

LANDSAT-P

JUL + 1977

												-
	)	I GMT	1 FI 1G	HT I	SP	ACFCRAF	TI	REF	RENCE	I REF	LCYCLE	1
	DATE "	1""D <sub>A</sub> Y""	T-DA	Y-7		RBITS"			RITS	DAY	i No.	ì
٠.												
	1:	1 182	1 89	1 /	1241	15-1242	R	5	7= 70	1 5	49	ľ
	2	EAL !	1 89	2	1242	29-1244	أح	7	34	1 6	49	í
	3	17184	1 89	3	124	3-124	56	31	98	7	49	i
	<b>4</b>	1 145	1 89	• 1	1245	57-1247	ra i	90	1-112	8	49	i
	5	1 46-	7 89	5	1247	71-1248	34	- 11	1-126	9	49	-
	6	147	1 89	5 i		35-1249		•	7=139	1 10	49	i
1	7	188	89	7 · i	1245	34-1251	1	140	1=153	111	49	į
	្រ ន	149	1 89	3		2-1252		154	-167	12	49	i
	9.	190	89	<b>9</b> i	1258	26-1253	19 i	168	R=181	1.3	49	ì
	10	191	90	o i	1254	0-1255	3 1	-	195	1 1 4	49	i
		1 192	7 90	r	1255	4-1256	7		209	1 15	49	ì
	12	193	90	<b>2</b> i	1256	H-1258	1	216	1-223	1 16	49	i
7.7	13	194	90	3 1	1258	2-1259	5 1	224	-237	1 17	1 49	i
	14	195	90	•		1260		238	1-251	1. 18	49	i .
	15	1 196	90	<b>5</b> 1	1261	0-1262	3 1		- 14	1 1	50	ĺ
1	16	197	90	5	1268	4-1243	7	1 5	- P8	1 2	50	i
	17	1-198-	<del>9</del> 0	<b>7</b>	1763	8-124F	1-r		- 42	T 3	50	-
	18	199	90	š į	1265	2-12-5	5 1	47	1- 56	1 4	50	1
	19	200	90	)	1266	6-1267	9 1	57	7- 70	5	50	i
i	20	201	91	)	1265	0-1249	3 i	71	- 54	1 6	50	
	- 21	202	91	l i		4-1270		8	- 98	7	1 50	
1	22	203	917	2		18-1272		90	-112	1 8	50	1
			r91	3	7272	2-1273	5 1		1-125	y '9 -	50	١.
1111	24	205	91	1	1273	6-1274	RI	127	-139	1 10	50	Ì
1	- 25	206	91	5 1	1274	9-1276	21	140	-153	1 11	50	ł
į	26	207	910		1276	3-1277	6	154	-167	1 12	50	
	27 -	208	9.1	7 1	1277	7-1279	0 1	168	181	1 13	50	r ·
	24	209	918		1279	11-1280	4 1	182	-195	1 14		1
1	29	710	1 91	1-	1280	5-1281	8 1	196	-203	1 15	50	
	30	211	92	) 1		9-1283		210	-223	1 16	1 50	ĺ
	31	212	1 92	. 1		3-1284		224	-237	1 17	50	
•											,	

LANDSAT+2

1				********			
	l j	•	FLIGHT !			I REF I	CYCLF I
	I DATE	ELDAALL.	DAY	BRETTS	TRANTE	DAY	VØ + 1
•							
	1	1 213 1	922	12847-12860		1.8	50 1
	. 2	1 214 1	923	12861-12874	1 = 14	_ I	51 /
	3	1 215 1	924	12875-12488	1 15= 28	1 2 1	51 1
	•	1 216	925	12889-12902	1 29- 42	3 1	51
	5	717	926	4.1E2.1.E0GE.1.		4 1	51
	) 6 ) 7	1 218 1	927	12917-12930	1 57- 70	1 5 1	51
	•	1 219 1	928	12931-12944	71 • 84	1 6 1	51
	i å	1 220 1	929	12945-12958	1 KH 98	1 7 1	51
	9	1 221	930 1	12959-12972	99-112	1 8 1	51 1
	10	1 222 1	931	12973-12986	1 113-126	1 6 1	51
	1 12	1 224 1	935	12987-12999	127-139	10 (	51 -1
	13	1 225 1	933	13000-13013	1 140-153	11 1	51
	1.5		934	13014-13027	1 154=167	1 12 1	51
1		1 226 1	935	13028-13041	1 168-181	1 13 1	51
	1 "15	1 227 1	936	13042-13055	1 182-195	1 14 1	51
-	16	1 228 1	937	13056-13069	1 196-209	15 1	51
	1 18	1 223	938	13070-13083	210-223	16	51
		1 530 1	9.39	13084-13097	1 224-237	1 17 1	51
	19	1 232 1	940 1	13098-13111	238-251	1 18 1	51
i	20	1 233	941	13112-13125	1 1 - 14		52
!	22	1 234 1	942	13126-13139	1 15- 28	1 2 1	52
	53	1 235 T	···944····	13146-13153	1 29- 42	1 3 1	52
	· · · · · ·			13154-13167		4 (	52 (
	24	1 236 1	945	13168-13181	1 57+ 70	1 5	52
	25 26	1 237 1	946   947	13182-13195	71 - 84	1 6 1	52
1		•	- 1 To 1	13196-13209	1 85 = 98	1 7 1	52
	27	1 239 1	948	13210-13223	1 99-112	I R	52
	2'n 29	1 240 1	949	13224-13237	113-126	1 9 1	52
ı		1 241	950 1	13238-13250	1 127-139	1 10 /	52
	30	1 242 1	951	13251-13264	1 140-153	1 11 1	52
1	31	1 243 1	952	13265-13278	1 154-167	1 12 1	52
•							

REPRODUCIBILITY OF THE ORIGINAL PAGE IS TOOK

LANDSAT-2

SEP,1977

•									
	1	GMT !	FI IGHT	I SPA	ACFCRAFT	1 1	REFERENCE	1 REF	CYCLE
	DATE	DAY	" DAY		REITS	-	ARBITS	I DAY	NO . 1
						:			
	1 - 1 - 1	244	953	1 1327	79-13292	ī	168=181	1.13	52
		245	954	The second second second	3-13306	i	182-195	1 14	52
	3	246	955	. , .	7-13320	;	196-209	15	52
	4	247	956		21-13334	i	210-223	16	52
	5	248	957		95-13348	. ; .	224=237	17	52
	6	249	958		9-13362	i	238-251	18	52
	7	250	959		3-13376	i	1- 14	1 4	53
	6	251	9.5		7-13390	1	15= 28	2	53
	9 1	252 1	961		1=13404	. [	29- 42	3	53
	1 10 1	P1.3	962		5-13418	1	43= 56	1 4 1	53
	) 137 i	254	963		9-13432	. r	57= 70	1 5 1	53
	1 1	255	964		33-13446				•
	1 13 1	256	965	11 12 11 11 11 11	7=13460	1.	71 - 84 85 - 98	1 . 6 !	53
!	1 1 4 4	257	966		1-13474	i		7	53
	15 - 1	258	967		15-13474 15-13488	1	99-112	1 8	53 1
!	1.6 L	259				1	113-126	9 1	53
	10 1	752 ( 760 T	968		9-13501		127-139	1 10 1	53
. !	•	,			12=13515		140-153	1111	53
	18 1	261	970		6-13529	1	154-167	1 12 1	53
. !	19	565 1	971		10-13543	1	168-181	1 13 1	53 1
1	20	263	972		4-13557	į.	182+195	1. 14 1	53 1
	21 1	264	973	•	X~13571	ı	194-209	1 15	53
ı	28.00	265	974		2-13585	+	210+223	1.5	53
	53- +	-266- t	975		6=13599-	7	224-237-	··· -·171	-53
į.	24 1	267 1	976		0=13613	1	238-251	1 18 1	53
- 1	251	268 1	977	1 1361	4-13627	1 30	-1 <b>1 4</b> 14	1 1 1	54
. 1	26	269	978	1 1362	K-13641	1	15- 28	1 2 1	54
	27	270	979		2=13655	1	29- 42	1 3 1	54
	24	271 1	980	1 1365	6-13669	1	43 <b>-</b> 56	1 4 1	54 !
	58 1.	272	981	1 1367	0-13483	7	57= 70	5 1	54
- 1	30	273	982	1 1368	4-13697	1	71 = ×4	1 6 1	54

LANDSATES

"6CT+1977

المناسبين							
	DATE	I GMT I			I REFFRENCE		
. ,	DAIF	I DAT	DAY.	BRSITS	I ARBITS		NB • 1
. 1			~~~				
1	7	1 274 1	983	1 13698-13711		<b>  7</b>	54
!	2	1 275	984	1 13712-13725		1 8 1	54
Į	. 3	1 276	985	1, 1,9726-13739		- L" - 9 i	54
	4	1 277 1	986	1 13740-13752		1 10 1	54
		7-278 7	987-	1 17753-13766			54-7
	6	1 279 1	988	1 13767-13780		1 12 1	54
- I	7	1 280 1	989	1 13781-13794	1 168-181	13 (	54
	8	1 281 1	990	1 13795-13808	1 182-195	1 14	54
ı	- 9	1 282 1	991	14809-13822	1 196-209	1 15	54
1	10	1 283 1	992	13823-13436	1 210-223	1 16 1	54
	11	P84	993	1 13837-13850	224-237	1 17	54 (
1	12	1 285 1	994	13851-13864	238-251	1 18	54
1	13	1 286 1	995	13865-13878		1 11	55
	4.4	1 267 1	996	13879-13492		2	55
i	15	( 288 )	997	13893-13906		3 1	55 I
i	16	289	998	13907-13920		4	55 I
	17	790	999	13921-13974	57. 70	- 5	-55
	18	291	1000	13935=13948	71 = 84	1 6 1	55
i	19	292	1001	13949=13962	85 - 98	7	55 I
	20	1 293	1002	13963-13976	99-112	8	55
	21	1 294 1	1003	139 <b>7</b> 7≠13990	1 113-126		
··.·.	22	1 295	1004	13991=14003	1 127=139	, ,	55
J		1-296-1			1 147=139	10	55
	24	297	1006	14018-14031			55
1	25	1 298 1	1007		1 154-167	1 12 1	55
	26	1 299	1007	14032=14045	168=181	1 13 ;	55 (
5 ·	27	•		14046=14059	1 12-195	1 14 1	55 I
į		1 300 1	1009	14060-14073	1 194-209	1 15 1	55
1	28	1 301 1	1010	14074-14087	1 210-223	1 16 1	55
1	29	305 1	1011	14058-14101	1 224-237	1 17	55. 1
1	30	1 303 [	1012	14102-14115	1 238-251	18 F	55
. 1	31	1 304 1	1013	14116=14129	1 1- 14	1 1 1	56
•							

LANDSAT-P

GMT   FIIGHT   SPACECRAFT   REFERENCE   REF   CYCLE     DATE   DAY   DAY   9RBITS   3RBITS   DAY   N8.     1   305   1014   14130-14143   15-28   2   56     2   306   1015   14144-14157   29-42   33   56     3   307   1016   14156-14171   43-56   4   56     4   308   1017   14172-14185   57-70   5   56     5   309   1018   14186-14199   71-84   6   56     6   310   1019   14200-14213   85-98   7   56     7   311   1020   14214-1427   99-112   8   56     8   312   1021   14224-14241   113-126   9   56     9   313   1022   14242-14254   127-139   10   56     9   313   1022   14255-14268   140-153   11   56     10   314   1023   14255-14268   140-153   11   56     11   315   1024   14269-14264   154-167   12   56     12   316   1025   14283-14296   168-181   13   56     13   317   1026   14297-14310   182-195   14   56     14   318   1027   14311-14244   196-209   15   56     15   319   1028   14325-14388   210-223   16   56     16   320   7029   14339-14352   224-237   17   56     17   321   1030   14353-14366   238-251   18   56     18   322   1031   14367-14380   1-   14   1   57     19   323   1032   14381-14394   15- 28   2   57     20   324   1033   14395-14408   29- 42   3   57     21   325   1034   14409-14422   43- 56   4   57     22   326   1035   14437-14464   85- 98   7   57     23   327   1036   14437-14464   85- 98   7   57     24   328   1037   14451-14464   85- 98   7   57     25   332   1040   14493-14409   113-126   9   57     26   330   1039   14479-14499   113-126   9   57     27   331   1040   14493-14505   127-139   10   57     28   332   1041   1450-14531   154-167   12   57     29   334   1043   1450-14531   154-167   12   57     30   334   1043   14534-14547   168-161   13   57				:					
1		1	GMT	FITGH	T   SP	ACECRAFT	I REFERE	NCF   REF	I CYCLF I
		"I DATE"	DAY	DAY		BRETTS	T" 8881	TS   DAY	1 NB . 1
3		1	1 305	1 1014	1 141	30-14143	15-	28   2	1 56
4		1 2	•	1 1015	1.41	44-14157	29-	42 [ 3	1 56 1
5		3	1 307	1 1016	1 141	58-14171	43=	56   4	56
6		1 4	80E. I		,	72-14185	1 [5,7=	70   5	1 56
7		5	1.308	T 1018	141	86-14199	71-	84' 1 6	·   *** 56     1
		1 6	1 310	1 1019	142	00-14213	85-	98   7	i 56 i
9   313   1022   14247=14254   127=139   10   56     10   314   1023   14255=14268   140=153   11   56     11   315   1024   14269=14282   154=167   12   56     12   316   1025   14283=14296   168=181   13   56     13   317   1026   14297=14310   182=195   14   56     14   318   1027   14311=14224   196=209   15   56     15   319   1028   14325=14338   210=223   16   56     16   320   1029   14339=14352   224=237   17   56     17   321   1030   14353=14366   238=251   18   56     18   322   1031   14367=14380   1= 14   1   57     19   323   1032   14381=14394   15=28   2   57     20   324   1033   14395=14408   29=42   3   57     21   325   1034   14409=14422   43=56   4   57     22   326   1035   14423=14436   57=70   5   57     23   327   1036   14437=14450   71=84   6   57     24   328   1037   14451=14464   85=98   7   57     25   329   1038   14451=14464   85=98   7   57     26   330   1039   14479=14492   113=126   9   57     27   331   1040   14493=14505   127=139   10   57     28   332   1041   14506=14519   140=153   11   57     29   333   1042   14520=14533   154=167   12   57		7	311	1 1020	1 142	14-14227	99=1	12   8	
10		I SA	1 312	1 1021	1 142	2x-14241	113-1	26 1 9	56
11		1 9	1 313		1 142	42-14254	1 127-1	.39 E 10	56
12		1 10	314	1 1023	. + 142	55-14268	1 140-1	53   11	1 56 1
13		F"" 11	315	1 1024	1 142	69-14282	154 = 1	67 1 12	1 56 1
14		1 12	316	1 1025	1 142	83-14296	1 168=1	81   13	1 56 1
15	-	1 13	11 317	1 1056	1 142	97-14910	1 182-1	95 (14)	1 56 1
16		1 14	318	1 1027	1 143	11-14724	1 196-2	109   15	1 56 1
17		15	1 319	1 1028	1 143	25-14738	1 210-2	23   16	1 56
16		15 16	1 350			39-14352	224-2	37   17	1 56 1
1 19		•	•				238-5	5177 18	56
20		1 18	355		1 143	6.7-14380	1 1 -	14   1	ı 57 l
1 21   325   1034   14409=14422   43= 56   4   57     22   326   1035   14423=14436   57= 70   5   57     23   327   1036   14437=14450   71= 84   6   57     24   328   1037   14451=14464   85= 98   7   57     25   1329   1038   14465=14478   99=112   8   57     26   330   1039   14479=14492   113=126   9   57     27   331   1040   14493=14505   127=139   10   57     28   332   1041   14506=14519   140=153   11   57     29   333   1042   14520=14533   154=167   12   57		1 19	353	•	1 1 43	81-14794	T /15≖	28 1 2	1 57
22   326   1035   14423=14436   57= 70   5   57		1 20	1 324	,	1 143	95=14408	59=	42   3	57
23   327   1036   14437=14450   71= 84   6   57     24   328   1037   14451=14464   85= 98   7   57     125   1329   1038   14465=14478   99=112   8   57     126   330   1039   14479=14492   113=126   9   57     127   1331   1040   14493=14505   127=139   10   57     126   332   1041   14506=14519   140=153   11   57     129   1333   1042   14520=14533   154=167   12   57     129   1333   1042   14520=14533   154=167   12   57     154=167   12   57     12   12   12   134		777 21	1 325		1 144	09=14422	1 47-	56 1 4	1 57 F
24   328   1037   14451=14464   35= 98   7   57   125   1329   1038   14465=14478   99=112   8   57   126   330   1039   14479=14492   113=126   9   57   127   1331   1040   14493=14505   127=139   10   57   126   1332   1041   14506=14519   140=153   11   57   129   1333   1042   14520=14533   154=167   12   57		•	•				1 57 •	70   5	
1   25   1   329   1   1038     14465=14478   99=112   8   57     1   26   1   330   1   1039   1   14479=14492   1   13=126   9   57     1   27   1   331   1   1040   1   14493=14505   1   127=139   1   1		+>3	1-327-			37-14450	~! 71:=~	84" 1"" 6	57
26   330   1039   14479=14492   113=126   9   57		1 24	1 328		1 144	51-14464	35=	98   <b>7</b>	57 T
27   331   1040   14493-14505   127-139   10   57     26   332   1041   14506-14519   140-153   11   57		75	1 329		T 144	65-14478	1 99-1	12 1 8	1 - 57 L
26   332   1041   14506-14519   140-153   11   57     29   1333   1042   14520-14533   154-167   12   57									1.5 - 40
29 1 333 1 1042 1 14520-14533 1 154-167 1 12 1 57									
		1 25							
1 30   334   1043   14534=14547   168=181   13   57		•							
		1 30	1 334	1 1043	1 145	34-14547	1 168=1	81   13	1 57 I

LANUSAT-2

# DEC#1977

I GMT   FLIGHT   SPACECRAFT   REFERENCE   REF	I CYCLF I
	I Grutar, I
DATE TOAY TOAY TORBITS TO ARBITS TO DAY	I NE . I
1 1 1 335 1 1044   14548-14561   188-195   14	57
	57 1
1 3 1 337 1 1046 1 14576-14589 1 210-223 1 16	
1 4 1 338 1 1047 1 14590-14603 1 224-237 1 17	57
18-251   339   1048   14604   14617   238 - 251   18	57"
1 6 1 340 1 1049 1 1461X-1461 1 W T- 14 1 1	58
1 7   341   1050   14632-14645   15- 28   2	58 [
1 6   342   1051   14646=14659   29= 42   3	58
1 9 1 343 1 1052 1 14660-14673 1 43- 56 1 4	1 88 1
1 10 1 344 1 1053 1 14674-14687 1 57- 70 1 75	1 58 1
7 1 14 1 345 1 1054 1 14688-14701 1 71- 84 1 6	58
- 1 12   346   1055   14702+14715   AS+ 98   7	1 58 1
1 13   347   1056   14716=14729   99=112   A	1 58 1
1 14   348   1057   14730-14743   113-126   9	i 58 l
1 15   349   1058   14744-14756   127-139   10	58
1 16   350   1059   14757-14770   140-153   11	i 58 l
T T 17 TT 351 TT 3060 TT 14771-14784 T T154-167 TT 12	1 88 1
1 18   352   1061   14785-14798   168-181   13	1
1 19   353   1062   14799-14812   182-195   14	1 58 1
1 20   354   1063   14814-14826   196-209   15	1 58 ]
1 21   355   1064   14827-14840   210-223   16	1 58
1 22   356   1065   14841-14854   224-237   17	1 58
TO THE PROPERTY SERVICES TO 14855-14868 (1) PREPROPERTY 18	1 58
1 24   358   1067   14869-14882   1-14   1-1	1 59 1
1 25   359   1068   14883-14896   154 28   2	1 59 1
1 26   360   1069   14897-14910   29-42   3	59
1 27   361   1070   14911=14924   43+ 56   4	59
1 26   362   1071   14925-14938   57-70   5	1 59 1
1 P9   363   1072   14939-1475P   71- 84   K	1 59 [
1 30   364   4073   14953+14966   85- 98   7	59
1 31 1 365 1 1074 1 1496/-14980 1 99-112 1 8	1 59 1

1

## APPENDIX C

## LANDSAT-2 DOCUMENTS ISSUED THIS REPORT PERIOD

No.	Document No.	Title
1	PIR-1N23-ERTS-179	The Approximation of Landsat-2 Initial Oscillatory and Dampling Characteristics, dated 4/2/76
2	PIR-14N5-L2-184	Fourth Quarterly Test of RBV System, dated 5/20/76
3	PIR-1N25-L2-185	Quality of Record/Playback MSS Data, dated 6/8/76
4	PIR-1N25-L2-187	Accidental DCP Transmission Permit Evaluation of DSC Capacity, dated 6/22/76
5	PIR-1N25-L2-187	Landsat WBVTR Error History, dated 7/9/76